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PHYTOLOGIA

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FEB 5 1990

NEW YORK

NEW NAMES AND COMBINATIONS, PRINCIPALLY IN THE ROCKY
MOUNTAIN FLORA-VII

William A. Weber

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U.S.A.

ABSTRACT

Two new genera, *Minuopsis* (Alsinaceae), and *Neolepia* (Brassicaceae) are proposed, and fourteen new taxa or combinations are proposed for North American vascular plants, in the genera *Allium*, *Bassia*, *Boechera*, *Critesion*, *Limnorchis*, *Minuopsis*, *Neolepia*, *Oligosporus*, *Rhus*, *Stipa*, *Tithymalus* and *Verzibia*.

KEY WORDS: Nomenclature, new taxa, Colorado, United States.

The sixth paper in this series was published in Phytologia 62:437-438. 1987.

Allium brandegei S. Wats. forma *viviparum* W.A. Weber, forma nova.
HOLOTYPE: UNITED STATES. Colorado: Routt Co.; along Fish Creek/
Long Lake trail just above upper falls on Fish Creek, ca 1.5 mi above
the lower falls; wet areas, rocky meadow along trail, in a population of
normal plants, 24 June 1989, W.F. Jennings (COLO 442565).

A species differt flores pro maxima parte bulbillis ovoideis 4-5
mm longis succedaneis.

Boechera vivariensis (Welsh) W.A. Weber, comb. nov. BASIONYM: *Ara-
bis vivariensis* Welsh, Great Basin Nat. 46:263. 1986.

I am following the treatment of Löve & Löve (1976) where the genus was
recognized on the basis of chromosome number and morphology.

Critesion brachyantherum (Nevski) W.A. Weber, comb. nov. BASIONYM:
Hordeum brachyantherum Nevski, Tr. Bot. Inst. AN SSSR (1)2:61. 1936.
Hordeum jubatum L. subsp. *breviaristatum* Bowden (1962). *Critesion
jubatum* (L.) Nevski subsp. *breviaristatum* (Bowden) Löve & Löve
(1984).

Löve (1984) justified recognition of *Critesion* in his Conspectus of the Triticeae.

Bassia sieversiana (Pallas) W.A. Weber, *comb. nov.* BASIONYM: *Suaeda sieversiana* Pallas, Illustr. Plantarum 45. 1803.

I am following the revision of *Bassia* by A.J. Scott (1978), in which many transfers from *Kochia* to *Bassia* were made, with the exception of this one.

Rhus aromatica Ait. subsp. **trilobata** (Nutt.) W.A. Weber, *comb. nov.* BASIONYM: *Rhus trilobata* Nutt. in T. & G., Fl. N. Amer. 1:219. 1838.

This is a combination inadvertently omitted from an earlier treatment of *Rhus* (Weber, *et al.* 1981).

Oligosporus dracunculus (L.) Polyakov subsp. **dracunculinus** (S. Wats.) W.A. Weber, *comb. nov.* BASIONYM: *Artemisia dracunculina* S. Wats., Proc. Amer. Acad. 23:279. 1888; *A. dracunculus* subsp. *dracunculina* (S. Wats.) Hall.

This is the southwestern North American race with longer, slender peduncles.

Minuopsis W.A. Weber, *genus nov.* Based on: *Minuartia* sect. *Sclerophylla* Mattfeld in Engler, Bot. Jahrb. Syst. 57, Beibl. 126:28. 1921 (new combinations), *op. cit.* 127:52 (discussion), 60 (diagnosis). 1922. TYPUS: *Arenaria pungens* Nutt.

Suffrutices, herbae perennes vel annuae et deinde petala calyce breviora rarius paullum longiora, rarissime subemarginatae (in speciebus annuis nunquam). Caules teretes vel subteretes. Folia linearia, subulata vel setacea, rarius lanceolata 5 mm latitudine nunquam attingentia, recurvata, nervo mediano valde incrassato rigida, foliorum fascicula patentia. Sepala acuta vel acuminata rarius ovato-obtusata. Calyx ovoideus vel urceolatus. Calyx fructifer sepalis erectis. Petala alba. Stamina uniseriata, epipetala nunquam petalorum unguiculo affixa. Glandulae breviores, subglobosae vel subquadratae et deinde stamine terminatae aut apice bipartitae et deinde stamen in vallecule ferentes. Semina nunquam discoidea, varia forma, dorso plana vel saepius convexa rarius concava, plus minusve reniformia, rarius usque 2.5 mm lata, daedaleo rugulosa vel regulariter areolata. Cotyledones incumbentes. [From Mattfeld, *op. cit.*]

Minuopsis nuttallii (Pax) W.A. Weber, *comb. nov.* BASIONYM: *Arenaria nuttallii* Pax, Bot. Jahrb. Syst. 18:30. 1893.

A. pungens Nutt. ex T. & G., Fl. N. Amer. 1:179. 1838, *non* Clemente ex Lagasca, Gen. et Spec. Plant. 15. 1816.

Minuopsis caroliniana (Walter) W.A. Weber, *comb. nov.* BASIONYM: *Arenaria caroliniana* Walter, Fl. Carol. 141. 1788. *Minuartia caroliniana* (Walter) Mattfeld.

Minuopsis michauxii (Fenzl) W.A. Weber, *comb. nov.* BASIONYM: *Alsine michauxii* Fenzl, Verbr. Als., tab. ad p. 18. 1833. *Minuartia michauxii* (Fenzl) Mattfeld.

Neolepia W.A. Weber, *nom. nov.* Based on: *Lepia* N.A. Desvaux, J. Bot. Agric. 3:165. 1815, *hom. illeg.*, *non* J. Hill, Exot. Bot. t. 29. 1759. TYPUS: *Thlaspi campestre* L.

Neolepia campestris (L.) W.A. Weber, *comb. nov.* *Thlaspi campestre* L., Sp. Pl. 646. 1753. *Lepidium campestre* (L.) R. Brown.

Lepidium campestre has been placed, with a small group of European species, in the section *Lepia* DC. Desvaux (1815) proposed the genus *Lepia* for the group, but it is a later homonym of *Lepia* J. Hill (1759), which is a *nom. rej.* vs *Zinnia* L. According to ICBN, Article 64, "A name... is illegitimate if it is a later homonym." Note 1 under the rule states: "Even if the earlier homonym is illegitimate, or is generally treated as a synonym on taxonomic grounds, the later homonym must be rejected." It would appear that the rule covers this instance.

Lepidium campestre is an anomalous species in that genus. The silicle is broadly winged distally, the wing involving the lower part of the style; the pedicels are horizontal, shorter than or equaling the silicle; the middle and upper stem leaves clasp the stem, and they are undivided. Most conspicuously, this group differs from *Lepidium* in its shovel shaped, not plane, silique which is gibbous on the dorsal face. Linnaeus was aware of the discordance, having placed this species in the genus *Thlaspi*; there is a strong superficial resemblance to *T. arvense*.

Limnorchis zothecina (Higgins & Welsh) W.A. Weber, *comb. nov.* BASIONYM: *Habenaria zothecina* Higgins & Welsh, Great Basin Nat. 46:259. 1986.

I do not agree with those who would unite these plants with the European genus *Platanthera*, nor do I think this should be part of *Habenaria*.

Stipa contracta (B.L. Johnson) W.A. Weber, *comb. nov.* BASIONYM:
Oryzopsis hymenoides (R. & S.) Ricker var. *contracta* B.L. Johnson. Bot.
 Gaz. 107:24. 1945. *Oryzopsis contracta* Schechter, Brittonia 18:342.
 1966.

The inclusion of *Oryzopsis hymenoides* in *Stipa* is discussed at length by Welsh (1987).

Tithymalus incisus (Engelmann) W.A. Weber, *comb. nov.* BASIONYM:
Euphorbia incisa Engelmann in Ives, Rep. Colorado River, IV. Bot. 27.
 1861.

This combination was never made by Norton, and my use of such a combination was an error, recently pointed out to me by Dr. Rob C.H.M. Oudejans.

Vexibia leachiana (M.E. Peck) W.A. Weber, *comb. nov.* BASIONYM:
Sophora leachiana M.E. Peck, Madroño 6:13. 1941.

The history and morphology of *Vexibia* are discussed by Weber (1987).

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ADDITIONS TO THE FLORA OF COLORADO - XII

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ABSTRACT

Twentynine indigenous and six adventive species are reported new to the Colorado Flora; eight notable range extensions are recorded. *Cardaria latifolia* is resurrected for *Lepidium latifolium*. *Viola scopulorum* and *V. rydbergii* are resurrected for *Viola canadensis*, sens. lat. in Colorado, and the report of *Trichophorum caespitosum* is rejected.

KEY WORDS: Nomenclature, floristics, biogeography, Colorado, United States.

The eleventh number of this series was published in Phytologia 58:385-388. 1985. Several of these names were used in Weber, W.A. *Colorado Flora: Western Slope* (1987) but the herbarium records have not been published. All specimens cited are from Colorado, United States and are in Herbarium COLO unless otherwise specified.

INDIGENOUS SPECIES

Abronia nana S. Wats. (NYC). Mesa Co.: Sinbad Valley, 2 mi NW, on right fork in valley, on gypsum outcrops of the Paradox Salt Member, Hermosa Formation, with scattered piñon and juniper, 5,750 ft. alt., T49N R19W S5 SW 1/4, 27 April 1987, J. Anderson 87-29.

Astragalus pubentissimus T. & G. (FAB). Rio Blanco Co.: ridge SE of Raven Ridge, T2N R103W S19, SW1/4, 5,475 ft. alt., on sandstone with *Gilia stenothyrsa*, *Eriogonum saurinum*, and *Distichlis*, 17 June 1981, S. Tabar 169 (CS).

Astragalus wootonii Sheldon (FAB). Conejos Co.: 0.5 mi SSE of Canyon, 2.5 mi SW of Las Mesitas, T32N R8E S6/7, 8,700 ft. alt., NW exposure with *Pinus ponderosa*, *Artemisia*, *Chrysothamnus*, *Poa* and *Festuca*. 21 June 1987, P. Douglas 1576 (CS). A range extension from northern New Mexico.

Bromopsis pubescens (Mühl. ex Willd.) Holub (POA). Boulder Co.: Green Mt., just W of Boulder, Long Canyon, NW slope, 7,000 ft. alt.: forming conspicuous stands of very tall plants with large inflorescences and pendent, broad

leaf laminae, with many internodes, 26 July 1989, *Weber & Hogan 18044* (*Bromus purgans* and *B. latiglumis* of Harrington (1954).

Carex lasiocarpa Ehrh. (CYP). Park Co.: Park Range, SE of Big Creek Lake just W of Pleasant Valley Ditch, T11N R82W S27, 9,100 ft. alt., floating mat fen, 2 Aug 1989, *Neely & Carpenter 5328*. A range extension from Montana and Idaho.

Carex livida (Wahlenb.) Willd. (CYP). Park Co.: East Lost Park, in a quaking fen, with *C. limosa*, *C. tenuiflora*, and *Eriophorum gracile*, 16 July 1989, *Weber & Cooper 18034*. A range extension for the Rocky Mountains south from Montana and Idaho.

Carex tenuiflora Wahlenb. (CYP). Park Co.: East Lost Park, in a quaking bog, with *C. limosa*, *C. livida*, and *Eriophorum gracile*, 16 July 1989, *Weber & Cooper 18036*. New to the contiguous western United States, a westward range extension from Minnesota.

Ceanothus martinii Jones (RHM). Rio Blanco Co.: 36 mi SW of Meeker, 3.9 mi up Swizer Gulch from Black Sulphur Gulch, Yankee Gulch Quadr., T3S R99W S14, dry, coarse shaly slope, 31 May 1977, *Zeise & Bartmann 3081*. Garfield Co.: mesa top near Logan Wash, 2,438 m. alt., July 1975, *Irvine & Gregory* (COLO 293895, photo of specimen at UAC). The report alluded to from Boulder County (Harrington 1954) proves to be a vegetatively spreading colony of the hybrid, *C. fendleri* X *C. herbacea*.

Cirsium barnebyi Welsh & Neese (AST). Rio Blanco Co.: Piceance Creek road just upstream from Rock School, extremely abundant on shales from here to upper end of canyon below Rio Blanco, 8 July 1986, *Weber 17808*.

Cirsium ownbeyi Welsh (AST). Rio Blanco Co.: Cross Mountain Gorge, T6N R97-98W, 1,800 msm., on steep sided canyon of sedimentary bedrock, talus slopes of weathered limestone, 19-20 Sept 1978, *Northcutt & Bunin* (COLO 318787).

Corydalis micrantha (Engelm.) A. Gray (FUM). Baca Co.: stabilized dunes along Cimarron River, 18 May 1981, *Colson & Wittmann 1635*.

Eragrostis lutescens Scribn. (POA). Jefferson Co.: infrequent on drying shore of small pond just W of Church's Lake, 1 mi S of Broomfield, 10 Oct 1953, *Weber 8660*.

Eriogonum clavellatum Small (PLG). Montezuma Co.: open slope northeast of Four Corners, *Harrington 10103* (CS,Reveal); Aneth Road, SE of Towaoc, W and S of Sentinel Peak, T33.5N R18W S28, 1,750 m. alt., 15 May 1986, *O'Kane & Anderson 2344* (COLO).

Eriogonum leptocladon T. & G. var. *leptocladon* (PLG). Mesa Co.: Rabbit

Valley, 3 mi S of I-70 interchange, 4,800 ft. alt., on slopes toward Colorado River, Aug 1983, *Joan Young 204*.

Eriogonum leptocladon T. & G. var. *ramosissimum* (Eastw.) Reveal (PLG). Montezuma Co.: State Line SE of Aneth, 6 Sep 1978, *J. Scott* (COLO 318876).

Frasera paniculata Torr. (GEN) Mesa Co.: Dolores River Canyon, W side, 0.2 mi E of State Line, on colluvial slopes and washes of derived from Cutler Formation, 4,600 ft. alt., T51S R104W S17, 16 June 1988, *J. Anderson 88-58*.

Hilaria rigida (Thurb.) Benth. (POA). San Miguel Co.: McIntyre Canyon, *Clair Button s.n.* (a reliable sight record).

Juncus tweedyi Rydb. (JUN). Larimer Co.: Rocky Mountain National Park; Moraine Park, on glacial alluvium, 8,000 ft. alt., 9 July 1988, *Yeatts 1943*.

Lemna minuscula Herter (*L. minima* Phil.) (LMN). Grand Co.: Shadow Mt. Dam, 30 May 1960, *Douglass 60-10*. Boulder Co.: South Boulder Creek SW of Cherryvale Road, 15 Aug 1985, *Weber 17498*. Alamosa Co.: 0.25 mi E of jct. State Hwy 17 and US Hwy 160, 7,540 ft. alt., 11 July 1986, *O'Kane 2515*. Rio Blanco Co.: near Marvine Lakes Trailhead, 15 June 1988, *Weber 17909*.

Lemna turionifera Landolt (LMN). Many collections, verified by Landolt, from Alamosa, Archuleta, Boulder, Denver, Elbert, Jefferson, La Plata, Larimer, Moffat, Routt, Sedgwick, Weld and Yuma counties.

Lesquerella arenosa (Richardson) Rydb. var. *argillosa* Rollins & Shaw (BRA). Logan Co.: clay ridges NE of Julesburg Reservoir, 1,200 m. alt., 21 May 1983, *Weber & Wittmann 16627, 16635*; 9 July 1983, *Wittmann 2262*.

Mahonia haematocarpa (Wooton) Fedde (BER). Las Animas Co.: south of Trinidad, 1902, *Archibald* (COLO 42840).

Mimulus breweri (Greene) Coville (SCR). Boulder Co.: Wild Basin entrance road E of Deer Haven, 16 June 1962, *Willard 627, 628*; Rainbow Lakes road, 10,000 ft. alt., 30 June 1949, *Livingston 172*. Eagle Co.: Gore Range, Eagle's Nest Wilderness area, 19 June 1987, 16 June 1988, *Hogan 232, 389, 391*. Grand Co.: Rocky Mt. Nat. Park, East Inlet, 27 June 1962, *Douglass 62-16, 23*; North Inlet trail, 2 mi N of Grand Lake, 29 June 1962, *Douglass 62-32*. Larimer Co.: Rocky Mt. Nat. Park; Fall River Road, 10,000 ft. alt., 8 July 1970, *Weber & Grove 14063*; between Dream and Nymph Lakes, 154 July 1959, *Willard 596*. Summit Co.: vicinity of Dillon, 4 June 1982, *Weber & Jackson 16137*.

A small and inconspicuous, relatively rare *Mimulus* inhabiting moist seep-ages, in thin humus layers on rock ledges in the subalpine forests of Colorado. Characteristically, it is a slender, unbranched annual a few centimeters tall, with only the basal cotyledons and one or at most two internodes; the uppermost node bears one or a few very small flowers, either yellow or purplish, in the leaf axils; these persist after anthesis. The species occurs in most of the western states, the Colorado stations representing the southeasternmost extension of range.

Oxybaphus glaber S. Wats. (NYC). Phillips Co.: sand hills 12 mi S of Holyoke, July, 1949, *Weber* 5026. Prowers Co.: 1 mi S of Holly, 3 Sep 1987, *McGregor* 38455. Weld Co.: sand hills, Roggen, 12 Sep 1934, *Ramaley* 14539, 14 Sep 1937, *Ramaley* 16297.

Oxybaphus decumbens (Nutt.) Sweet (NYC). Baca Co.: S facing slope of mesa N of forest road 551, T35S R49W S7, 1,450 m. alt., 17 May 1981, *Colson & Wittmann* 1617. Probably *O. bodinii* Holz. (1893), the type from Pueblo, is synonymous although the leaves (Plate xxi), are much narrower than those of our collections. Standley (1909), p. 344, cited [*Allionia*] *bodinii* from Pueblo, Larimer and Weld counties, and [*A.*] *decumbens* from Pueblo County (both by the same collector, Brandegee. (The species of *Oxybaphus* with axillary inflorescences are little known. Neither species was listed by Harrington (1954).

Packera pauciflora (Pursh) Löve & Löve (AST). Park Co.: South Park, quaking fen, High Creek, 10 mi S of Fairplay, 15 July 1989, *Weber & Cooper* 18016. A range extension southward from northern Wyoming.

Pinus strobiformis Engelm. (PIN). La Plata Co.: San Juan Mts., Electra Lake, along trail to Ignacio Lake, 26 Sep 1987, *M. Edwards* (COLO 431846). This species is common along the southern tier of counties as far east as the east base of Wolf Creek Pass.

Prosopis glandulosa Torr. (FAB). Las Animas Co.: Mesa de Maya; in gap between east and west sections, on Willard Loudon ranch NW of Branson; N-facing slope of Phillips (Hardesty) Canyon between Kelly and Nestor branches; two shrubs, badly winter killed, with new growth 1 meter tall, 23 Aug 1985, *Weber & Hogan* 17516. Known to the Loudon family from the time of the original homestead (1901-1902), 5,500-6,000 ft. alt., T35S R55W S9, Cobert Mesa North Quad. 1972. This is the first herbarium record for Colorado since Greene collected it in midwinter "in mountains between the Purgatory and Apishapa, 30 mi N of the state line" on Jan 21, 1880 (letter to Asa Gray at GH), and the northernmost locality known for the species.

Salix myrtilifolia Andersson (SAL). Park Co.: South Park, along High Creek, ca 10 mi S of Fairplay, in extremely rich fen fed by calcareous seeps,

with *S. planifolia* and *S. candida*, low and spreading, not at all glaucous, 22 June 1989, *Cooper s.n.* (COLO 442562, CAN), !G. Argus. Unreported in western North America south of about 60° N. in Alaska and Canada.

ADVENTIVE SPECIES

Apera interrupta (L.) P. Beauv. (POA). Yuma Co.: Arikaree River, 3 mi NE of Beecher Island, T2S R43W S12, 3,470 ft., Beecher Island NW Quadr., riverbottom, 10 June 1988, *Neely 5114*. !C. Reeder.

Bothriochloa bladhii (Retz.) S.T. Blake (POA). Kit Carson Co.: 6 mi. W of Stratton on roadside, Hwy. I-70, 1 Nov 1981, *Brooks 15630*.

Juncus effusus L. (JUN). Boulder Co.: South Boulder Creek, on Rolling Rock Ranch near Marshall, 20 July 1986, *Cooper 1653*. Probably introduced with wetland reseeding projects.

Lepidium strictum (S. Wats.) Britton (BRA). San Miguel Co.: Little Gypsum Gap, N of Gypsum Gap, piñon-juniper woodland, 30-31 May 1982, *Siplivinsky & Beck 3407*. More likely to be adventive than a natural disjunction from the Far West.

Lotus tenuis Waldst. & Kit. (FAB). Boulder Co.: White Rocks, 7 July 1928, *Ramaley 12020* (!Ottley); abundant in old pasture, Valmont Road, E of Boulder, 1 July 1946, *Weber 4208*; East Jay Road for 0.5 mi on each side of North 63rd, NW of Boulder, 22 June 1986, *Stitzel* (COLO 198122). This species has persisted without spreading more than a few miles beyond the original stand colonized over 60 years ago.

Salix alba L. var. *vitellina* (L.) J. Stokes (SAL). Harrington (1954) listed *S. fragilis* for Colorado but evidently neglected to include the equally common escaped or persistent *S. alba*. I cite one specimen for the record. Jefferson Co.: 2 mi S of Broomfield on Wadsworth Blvd., 10 June 1962, *Chambers 190*.

MISCELLANEOUS TAXONOMIC NOTES

Cardaria latifolia (L.) Spach (BRA). *Lepidium latifolium* L. is anomalous in the genus, since it is a very tall rhizomatous perennial with masses of paniculate inflorescences which hardly elongate with age, silicles that are not notched but are inversely cordate and somewhat inflated, with an oval, not slender replum. Its placement, by Spach, in *Cardaria*, has been ignored for over a hundred years. At the present time, this species is a rampant weed all over

the low areas of Colorado, invading ditches and wetlands on both sides of the Continental Divide.

Rollins (1940) listed the characteristics separating *Cardaria* from *Lepidium* as follows: 1. The fruits of *Cardaria* are indehiscent, those of *Lepidium* are dehiscent. 2. The siliques of *Cardaria* are neither strongly flattened nor carinate margined, while in the rest of *Lepidium* they are strongly flattened contrary to the narrow septum and the margins are either carinate or at least strongly compressed. 3. The siliques of *Cardaria* are somewhat inflated; those of *Lepidium* are not. The nectar glands of *Cardaria* are comparatively large and well developed, completely surrounding the base of the single stamens and subtending the paired stamens; in *Lepidium* they are small, poorly developed, merely subtending the single stamens and only weakly developed below the paired stamens, or are absent.

Lepidium latifolium fits all of the criteria for *Cardaria* except for the fact that the siliques are tardily dehiscent rather than strictly indehiscent. In addition, it is worth noting that, whereas in *Lepidium*, the racemes elongate very much after anthesis, in *Cardaria* the racemes remain foreshortened even in fruit. In view of these facts, I suggest that *Cardaria latifolia* (L.) Spach be revived. The species is variable in the presence or absence of scattered long hairs on the silicles. In the Colorado material these hairs are present.

"*Viola canadensis*" in the Rocky Mountains. Recent floras dealing with the Rocky Mountain states and the Great Plains uniformly reduce all variants of this group simply to *V. canadensis* L., a notable exception being the recognition of var. *rugulosa* (Greene) C.L. Hitchc. (Great 1986). Fernald (1950) distinguished these taxa as species as follows: *V. rugulosa*: "differing [from *V. canadensis*] in the elongate cord-like subterranean stoloniferous rhizome and slender crowns; upper leaves more broadly ovate and more abruptly tipped; stipules more scarious; seeds 2-2.2 mm long [vs. 1.5-2 x 1.2-1.5 mm]." Most floras have not followed Fernald in giving the variety specific status. I believe it is time to open up the entire question of the taxonomy of the *V. canadensis* group, because it appears that in Colorado, at least, two clear species are involved, and neither of them appears to belong to *Viola canadensis* of the eastern United States.

Field observations indicate that two distinct entities can be recognized. These occur in the same areas and are distinguishable on morphological and ecological grounds. The first is the plant which Gray called *V. canadensis* var. *scopulorum*. It is a plant of relatively dry sites, often among rocks, in the foothills. It ranges from the southern Rocky Mts. south into northern México. Characteristically, it has small, dark green leaves, longer than wide, and small flowers. The plant is glabrous or so nearly so that the hairs, if present, are extremely short and almost invisible with a hand lens. Compared to *V. canadensis* sens. str., the flowers are about half the size (also noted by

Greene 1902). This plant is Gray's var. *scopulorum*. I would propose that, at our present state of knowledge, this plant be referred to as *V. scopulorum* (A. Gray) Greene.

The second is the plant which is currently passing as *V. canadensis* var. *rugulosa* (Greene) C.L. Hitchc., or *V. rugulosa* Greene. The name was used by Greene for a specimen known to him from only one collection, Sandberg, Minnesota: Hennepin Co., rich woods, June 1891. He described this as having "petals rather small, otherwise much as in *V. canadensis*." On the next page, Greene described *V. rydbergii*, which he referred to as "the so-called *V. canadensis* of the more northerly Rocky Mountains." This plant was described as having the leaves "underneath decidedly hirsutulous, with shorter hairs scattered over the whole surface, but the stems glabrous; the broad leaves from subreniform in the lowest, to ovate-lanceolate in the uppermost, all more or less truly acuminate, the largest more than 3 inches broad...; corollas much as in *V. canadensis* though notably broader in proportion to their length."

The description of *V. rydbergii* Greene matches the second entity, a plant of moist streamsides and canyon bottoms, usually in shade, with flowers twice the size of *V. scopulorum*. The large, pale green, acuminate, very broadly ovate, almost reniform, leaves, pilose on the veins beneath contrast distinctly with the features of the latter. The two species occur in the same canyons within a few feet of each other, where the habitat gradient is steep, and do not intergrade. Probably their infrequent sexual reproduction insures the separation. Pending future research, I believe it wiser to go with the name that Greene based on a Colorado type, rather than apply a name based on one collection from Minnesota. Therefore, I propose that the name *V. rydbergii* Greene be used for the Rocky Mountain species.

RANGE EXTENSIONS AND REDISCOVERIES

Aster alpinus L. subsp. *vierhapperi* Onno (1932) (AST). The Colorado record was based on an old collection: Grand Co.: Berthoud Pass, Jul 1903, Tweedy 5797 (!NY). We can now report a second collection: Mineral Co.: La Garita Wild Area, Upper Rat Creek through Spring Creek Divide, 11-13 Aug 1968, Willard 686. This is on the Continental Divide north of Creede, T43N R1W S22-24.

The subspecies was based mainly on the presence of minute, short, biserial trichomes scattered on the stems and phyllaries.

Carex scirpoidea Michx. (CYP). Park Co.: High Creek, 10 mi S of Fairplay, abundant in a quaking calcareous fen, 15 Jul 1989, Weber & Cooper 18027. Also noted in Sacramento Gulch NW of Fairplay and in Lost Park fens. Known

in Colorado previously from an historic specimen collected in South Park by John Wolf.

Carex viridula Michx. (CYP). Park Co.: High Creek, 10 miles S of Fairplay, in a quaking calcareous fen, 15 Jul 1989, *Weber & Cooper 18021*. Previously known in Colorado from the San Juan Mountains and North Park.

Comarum palustre L. (ROS). Jackson Co.: Park Range, Large kettle lake just N of Shafer Creek, N of Fryingpan Basin Trail, T10N R82W S10, 9,180 ft. alt.; in *Sphagnum* mat with *Drosera rotundifolia*, 7 Aug 1989, *Neely & Carpenter 5395*. First record for the eastern slope of Colorado.

Descurainia ramosissima Rollins (BRA). Park Co.: South Park, roadside weed, access road to High Creek fens, 15 Jul 1989, *Weber & Cooper 18018*. A range extension north from the San Luis Valley. This new species, it seems to me, is most likely a recently developed race of *D. richardsonii* with an aggressively weedy propensity rather than a species in its own right.

Drosera rotundifolia L. (DRS). Jackson Co.: Park Range: large kettle lake between Shafer and Goose Creeks, N of Fryingpan Basin Trail, T10N R82W S10, 9,140 ft. alt.; in *Sphagnum* mat, 3 Aug 1989, *Neely & Carpenter 5387*. Previously known from a very small population at a single station in Gunnison County, an iron fen on Mt. Emmons, near Crested Butte.

Eriophorum gracile K. Koch (CYP). Park Co.: Lost Park, forming large areas in quaking fens in the drainage of East Lost Creek, 16 Jul 1989, *Weber & Cooper 18035*. Also collected in a peat fen in Sacramento Gulch, NW of Fairplay, 16 Jul 1989, *Weber & Cooper 18040*. Jackson Co.: kettle lake due S of Big Creek Lake, T11N R82W S28, 9,350 ft., Pearl 7.5 Quad., 2 Aug 1989, *Neely & Carpenter 5364*. From a distance, populations of the species can be distinguished en masse by the reddish tinge given by the leaf tips. The single locality previously known for this species, a meadow near Stonewall, Las Animas Co., was drained and converted to a horse pasture.

Salix candida Fluegge (SAL). Park Co.: South Park, High Creek calcareous fens, 10 mi S of Fairplay, 15 Jul 1989, *Weber & Cooper 18022*. At this station the species is very abundant, occurring along with *S. myrtillofolia*, *S. wolfii*, *S. brachycarpa* and *S. planifolia*. Otherwise, the species is known from the Laramie River near Cameron Pass.

REJECTED TAXA

Trichophorum caespitosum (L.) Hartm. The specimen forming the basis for the Colorado record, a Hall & Harbour collection (G), so identified by C.B.

Clarke, has been examined. It proves to be identical to the two other sheets of the same collection, which belong to *T. pumilum* (Vahl) Schinz & Thell. It is noteworthy that *T. caespitosum* occurs in the Uinta Mts. of Utah, where evidently *T. pumilum* is absent.

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ASTER INTRICATUS (ASTERACEAE: ASTEREEAE) TRANSFERRED TO
MACHAERANTHERA

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ABSTRACT

Aster intricatus (*Leucosyris carnosa*) is transferred to *Machaeranthera* as *M. carnosa* (A. Gray) Nesom. On chromosomal and morphological grounds it is most closely related to *M. riparia* and another anomalous species, *Aster blepharophyllus* (in a separate paper, also being transferred to *Machaeranthera*).

KEY WORDS: *Machaeranthera*, *Aster*, *Leucosyris*, Asteraceae, Astereae.

The taxonomic position of *Linosyris carnosa* A. Gray (= *Leucosyris carnosa* = *Aster intricatus*) has perplexed students of the Astereae since the species was first recognized. Gray first included it in Cassini's genus *Linosyris*, which is typified by the Old World species *Aster linosyris* (L.) Bernh. (= *Linosyris vulgaris* DC.). He later renamed (heterotypically) the same species as *Bigelovia* before realizing that the two taxa were conspecific. Greene erected the monotypic *Leucosyris* to comprise the single species *Leucosyris carnosa*. He later included *Aster spinosus* Benth. in *Leucosyris*, but the latter species is now known to be most closely related to *Erigeron oxyphyllus* E. Greene (Nesom 1989).

Sundberg (1988) has studied *Aster intricatus* in relation to the group of species traditionally considered as *Aster* subgenus *Oxytripolium*. He concluded that the species does not belong in the genus *Aster*, and although he considered the possibility of relationships with *Machaeranthera* and *Hazardia*, he maintained it as the monotypic *Leucosyris*. After finishing his dissertation, however, Sundberg decided that it belonged with *Hazardia* and distributed specimens annotated as *H. carnosa* (A. Gray) ined. A more complete taxonomic study of this species, including details of typification and infraspecific variation, is forthcoming (Sundberg, in prep.).

Jones (1980) maintained *Aster intricatus* in *Aster*, most closely related to *A. spinosus*, although she later speculated (Jones & Young 1983) that *A. intricatus* might have been derived by hybridization between species of *Aster*

and *Machaeranthera* and omitted it from the cladistic analysis of *Aster*. In 1982, on annotations of specimens of the peculiar *A. blepharophyllus* A. Gray, Jones also observed and noted a similarity between it and *A. intricatus*. Ron Hartman (personal comm.) also has commented that the resemblance between those two species is suggestive of a close phyletic relationship.

Nesom, Vorobik & Hartman (in press) have transferred *A. blepharophyllus* to *Machaeranthera*, and molecular studies by David Morgan (in prep.) at the University of Texas support this placement. *Aster blepharophyllus* appears to be morphologically most similar to *M. riparia* (Kunth) A.G. Jones of the *Arida* group (*sensu* Hartman 1976). Including *A. intricatus*, these three species form a subgroup of essentially glabrous plants with mostly entire and succulent leaves among the other species of the *Arida* group, which are highly stipitate glandular with thinner, strongly toothed to pinnatifid leaves. A chromosome number of $n=5$ pairs is characteristic of all species of the *Arida* group, including *M. riparia* and the two "asters" under discussion (Hartman 1976; Sundberg 1986; Nesom, *et al.* in press) and is not found elsewhere in the genus. Achenes, such as those of *A. intricatus* and *A. blepharophyllus*, with numerous, thin, superficial nerves are also characteristic of the *Arida* group. *Aster intricatus* and *A. blepharophyllus* further resemble each other in their stiffly ascending stems, turbinate to narrowly campanulate heads, and particularly in their rhizomatous habit. Rhizomes apparently have been developed independently in two other species of *Machaeranthera*, one of the *Sideranthus* group (*sensu* Hartman, 1976), and one of sect. *Psilactes*. Finally, the hypothesis of relationship between *Aster intricatus* and the *Arida* group is reinforced by the geographic distribution of the former, which lies within that of the *Arida* group, all species of which are restricted to the southwestern United States and northwestern México.

Aster intricatus differs prominently from *A. blepharophyllus* in its much taller stems, lack of basal rosettes, lack of foliar marginal cilia, and rayless heads. The lack of ray flowers, however, is not unusual in *Machaeranthera*, because three other species (all of the *Blepharodon* group, see Hartman 1976) also are rayless.

Although the DNA of *Aster intricatus* has not yet been studied, molecular data perhaps will provide more precise hypotheses regarding the phyletic relationships of this species. Nevertheless, its similarity to *Machaeranthera* (through *A. blepharophyllus* and *M. riparia*) is clear, and in order to use the name in the forthcoming "Compositae of México" (Turner & Nesom in prep.), I propose the following combination.

Machaeranthera carnosa (A. Gray) Nesom, *comb. nov.* BASIONYM:
Linosyris carnosa A. Gray, Pl. Wright. 2:80. 1853. *Leucosyris carnosa*
(A. Gray) E. Greene, Fl. Francisc. 384. 1897. *Aster carnosus* (A. Gray)
A. Gray *ex* Hemsl., Biol. Centr.-Amer. Bot. 2:120. 1881; non *Aster*

carnosus Gilib., 1781.

Bigelovia intricata A. Gray, Proc. Amer. Acad. Arts 17:208. 1882.

Aster intricatus (A. Gray) S.F. Blake, J. Washington Acad. Sci. 27:378. 1937.

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THE *SOLIDAGO CANADENSIS* (ASTERACEAE: ASTEREA) COMPLEX IN TEXAS WITH A NEW SPECIES FROM TEXAS AND MÉXICO

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ABSTRACT

Each of the three taxa of the *Solidago canadensis* complex that occur in Texas has a distinct geographic range almost completely allopatric with the others. *Solidago altissima* var. *altissima* is restricted to eastern Texas; *S. altissima* var. *gilvocanescens* (as provisionally treated here) mostly occurs in the Texas panhandle and west Texas plains, extending south through New Mexico to Culberson and El Paso counties, Texas. The taxon previously known as *S. canadensis* var. *canescens* (*S. altissima* var. *canescens*), which occurs from the Edwards Plateau to the trans-Pecos region and Coahuila and Chihuahua of adjacent northern México, is morphologically distinct from both varieties of *S. altissima* and is here redescribed and retypified at the specific rank as *S. juliae*, *spec. nov.* The first chromosome number reports for this taxon ($n=9$ pairs) are presented. Descriptions are provided for each of the three taxa recognized and a key summarizes the differences among them.

KEY WORDS: *Solidago*, Asteraceae, Astereae, Texas, México.

In connection with taxonomic studies of the Compositae of both México and Texas, the following observations are presented on plants of those areas known as the "*Solidago canadensis* L. complex" (Croat 1972; Melville & Morton 1982; Semple, *et al.* 1984). These are generally tall plants with pubescent stems, 3 nerved, lanceolate leaves, and secund heads in a large, pyramidal capitulescences with at least the lower branches ascending to recurved.

In their useful treatment of *Solidago* from Texas and Oklahoma, Taylor & Taylor (1984) recognized the occurrence in Texas of four varieties of *S. canadensis*: var. *gilvocanescens* Rydb., var. *hargerii* Fern., var. *salebrosa* (Piper) Jones and var. *scabra* Torr. & Gray. They provided generalized descriptions of the geographic distributions of these taxa but made no distinctions among them on their single distribution map for the species. In the present study, I recognize in Texas var. *scabra* (as *S. altissima* var. *altissima*), var. *gilvocanescens* (as *S. altissima* var. *gilvocanescens*), and an additional taxon not

among the four treated by Taylor & Taylor. In my view, var. *salebrosa* and var. *hargeri* (both *sensu* Taylor & Taylor) do not occur in Texas; further comments on the latter two taxa are found in the text below.

Solidago altissima L., Sp. Pl. 878. 1753. var. *altissima*.

S. canadensis var. *scabra* (Mühl.) Torr. & Gray, Fl. N. Amer. 2:224. 1842.

S. altissima var. *pluricephala* M.C. Johnston, Southw. Naturalist 14:372. 1970.

Plants 2-20(-30) dm tall, propagating by slender rhizomes. Stems moderately to densely spreading puberulent to short pilosulous. Leaves thick, ovate-lanceolate, 3 nerved, 5-11 cm long, 9-18 mm wide, (3-)4-7(-10) times longer than wide, usually sharply reduced in size immediately below and within the capitulescence, the upper surface sparsely scabrous, distinctly darker green, often rugulose and often somewhat shiny, moderately pilosulous, at least on the veins, and lighter colored beneath, the margins revolute, almost always with 5-10 pairs of shallow but sharp teeth on the distal 2/3. Heads secund on a large, pyramidal to ovoid capitulescence; inner phyllaries (2.8-)3.4-4.0 mm long. Ray flowers 9-14, the corollas 3.8-5.0 mm long. Disc flowers (2-)3-5, the corollas 3.0-4.0 mm long. Chromosome number, $n=27$ pairs.

Widespread and common in the West Gulf Coastal Plain of the eastern third of Texas; ravines, low areas, open woods, disturbed sites; flowering August-November(-December).

This taxon is often treated as *Solidago canadensis* var. *scabra*, but in the eastern United States and Canada it is broadly sympatric with and genetically isolated from other varieties of *S. canadensis* (Melville & Morton 1982). Var. *altissima* is hexaploid ($n=27$ pairs) according to many reports from over its entire range (e.g., Croat 1972; Semple *et al.* 1984), including at least one from Texas (Beaudry 1963). Both Melville & Morton (1982) and Semple *et al.* (1984) have recognized *S. altissima* as a species distinct from *S. canadensis* and considered var. *altissima* and *S. altissima* var. *gilvocanescens* to be more closely related to each other than to any other taxa in the *S. canadensis* complex. Var. *altissima* supposedly forms intermediates with var. *gilvocanescens* (Rydb.) Semple, although this has never been unequivocally demonstrated.

The type of *Solidago altissima* var. *pluricephala* is from Cameron County, Texas, and is characterized by a large number of small heads (inner phyllaries 2.8-3.2 mm long), each with a slightly smaller than typical number (2-4) of disc flowers. *Solidago altissima* is absent from the Rio Grande plains except for Cameron Co., and all collections from there have been made from a single, small area (M.C. Johnston, personal comm.), where it is possible that they have been introduced. Small headed plants similar to these, however, occur

further northeast all along the Texas coastal region and into Louisiana. They intergrade with the more typical form for the species and formal recognition of var. *pluricephala* is not warranted. These small headed forms probably were the basis for the claim by Taylor & Taylor (1984) that *Solidago canadensis* var. *hargerii* occurs in the "eastern portion of coastal Texas." I have not seen Texas specimens that should be identified as var. *hargerii*, which appears to be restricted to the north central United States and adjacent Canada (but see comments following var. *gilvocanescens*).

South of Texas, *Solidago altissima* occurs in a relatively typical form in México from Nuevo León (in the vicinity of Monterrey) and north central Tamaulipas through Veracruz to Oaxaca. These plants have a greater number of disc flowers ([5-]6-7) than those in Texas, but they are unquestionably the same species.

I have mapped plants from prairies in Denton and Grayson counties as *Solidago altissima*, but in that area the leaves are slightly broader with barely revolute margins and the hairs of the upper surface are thinner and longer, suggesting that they may be var. *gilvocanescens* or forms intergrading with that taxon.

Solidago altissima L. var. *gilvocanescens* (Rydb.) Semple. Phytologia 58:430.

1985. *S. canadensis* var. *gilvocanescens* Rydb., Contr. U.S. Natl. Herb.

3:182. 1895. *S. gilvocanescens* (Rydb.) Smyth, Trans. Kansas Acad. Sci.

16:61. 1899.

Plants mostly 9-16 dm tall, propagating by slender rhizomes. Stems moderately to densely puberulent with upcurved, or less commonly, straight hairs. Leaves at mid stem ovate-lanceolate, relatively thin textured, the margins not revolute, entire to shallowly or coarsely serrate. 8-13 cm long, (8-)11-20 mm wide, 6-9 times longer than wide, the upper surfaces with thin based, ascending-appressed hairs, lower surfaces more or less evenly hispid-pilose, more densely hairy than the upper surfaces. Phyllaries lanceolate, strongly graduated, the inner 3.2-4.0 mm long. Ray flowers 10-13. Disc flowers (3-)4-6(-7), 3.2-3.8 mm long. Chromosome number, $n=9$, 18, 27 pairs.

Mostly along streams and rivers in open plains in the Texas Panhandle and west central plains counties, extending south through New Mexico to El Paso and Culberson counties, Texas; flowering (August-)September-November.

Taylor & Taylor (1984) also apparently treated these plants as var. *gilvocanescens*. According to the geographic distribution of the varietal taxa verbally sketched by Croat (1972), however, they would be var. *hargerii*. In contrast, both var. *hargerii* and var. *gilvocanescens* were mapped as taxa of the north central to northern Great Plains (Great Plains Flora Assoc. 1977), and neither was recognized from Texas and Oklahoma; instead, in that atlas, all the plants of the *S. canadensis* complex from these two states were referred to var.

scabra. Barkley (1986), however, noted that var. *hargerii* extends southwest to New Mexico. Clearly, the taxonomic status of the Texas Panhandle plants related to *Solidago altissima* is not resolved, but I follow recent precedent in provisionally referring to them as var. *gilvocanescens*, although to emphasize the close similarity to *S. altissima*, I have used the combination by Semple. A more definitive establishment of the correct name for these plants, as well as other varietal taxa, awaits a much needed study of the whole *S. canadensis* complex.

The difference between var. *altissima* and var. *gilvocanescens* in Texas is subtle but real. Furthermore, plants nearly identical to this form of var. *gilvocanescens* occur throughout New Mexico and into eastern Arizona. They appear to be the most common form of the *Solidago canadensis* complex that occurs in New Mexico, although they are somewhat variable in robustness of habit and in leaf size and shape. The New Mexico and Arizona plants differ from those in Texas only in the number of flowers per head, with the disc flowers ranging up to 8 and the rays ranging both higher and lower in number (7-15). Although this taxon might be expected in northern Chihuahua, I have seen no collections of it from México.

Solidago altissima var. *gilvocanescens* from the north central United States has been reported both as diploid and tetraploid (Semple *et al.* 1984), and it is especially noteworthy that three hexaploid populations of what I refer to here as var. *gilvocanescens* were reported by Ward & Spellenberg (1986 [as var. *scabra*]) from southeastern New Mexico. This emphasizes the similarity between var. *altissima* and var. *gilvocanescens* in the southwestern central United States. Further chromosome counts will be critical in deciphering the pattern of variation among the variants of *S. altissima*.

The plants of a population system of *Solidago* in McKittrick Canyon of Culberson Co., Texas, and in adjacent Eddy Co., New Mexico, are included with var. *gilvocanescens* although their leaves are more narrowly lanceolate than typical, the upper leaf surfaces slightly more hairy, and the heads with slightly more flowers (rays 11-15, discs 5-8). The stem and leaf pubescence, however, is much more similar to that of var. *gilvocanescens* than to any other possible relative. These plants are probably the basis for the record of the putative occurrence in Texas of *S. canadensis* var. *salebrosa* (Taylor & Taylor 1984), but the latter taxon is restricted primarily to the Pacific Northwest and northwest Great Plains (Keck 1959; Barkley 1986), and I find no evidence for its existence in west Texas. The diploid chromosome count reported for var. *salebrosa* from Nuevo León, México (Ward & Spellenberg 1988) is from a local form of *S. missouriensis* Nutt.

A NEW SPECIES FROM TEXAS AND MÉXICO

Johnston (1970) correctly included in the Texas flora a taxon that he called *Solidago altissima* var. *canescens* (A. Gray) M.C. Johnston, and he observed

that it ranges from the Edwards Plateau to the trans-Pecos region. Taylor & Taylor (1984), in contrast, acknowledged its occurrence only by noting that it has been "reported from southwest Texas based on collections by Berlandier, Lindheimer, Bigelow, and from southern New Mexico by Thurber. The description of narrow, entire leaves and its range indicate this plant is most likely not a variety of *S. canadensis* but of *S. velutina* [DC.]."

My studies confirm the observations of Johnston. I recognize the existence of a distinctive taxon of *Solidago* in southwestern Texas and add northern Coahuila and northeastern Chihuahua, México, to its range (Figure 1). It is slightly continuous with var. *altissima* at the eastern extremity of its range and with var. *gilvocanescens* at the western extremity, but otherwise it is essentially allopatric with both of these taxa. There is no evidence, however, that would support its classification as a variety of *S. altissima*. There are no specimens that suggest morphological intergradation occurs between var. *canescens* and var. *altissima* where they meet along the eastern edge of the Edwards Plateau. At the western end of its range, there is variability in var. *canescens* (see comment below) suggestive of genetic input from var. *gilvocanescens* or perhaps some other species, but there is no evidence of intergradation. Further, var. *canescens* is diploid (see below) and chromosomally discontinuous from the hexaploid var. *altissima* as well as the hexaploids of var. *gilvocanescens* reported from southeastern New Mexico.

The observation by Taylor & Taylor (1984) that var. *canescens* might be a variety of *Solidago velutina* apparently stemmed from the similarity in stem pubescence between the two. Plants of the latter, however, are much smaller in stature with oblanceolate to obovate leaves, longer phyllaries and longer achenes (Nesom 1989b), and they apparently are more closely related to the *S. nemoralis* complex than to the *S. canadensis* complex. *Solidago velutina* overlaps in distribution with var. *canescens* in trans-Pecos Texas and northern México, but the former usually occurs in much drier habitats. Some collections from around Saltillo, México, suggest that hybridization occasionally may occur between the two, but certainly not to the extent one would expect if they were conspecific.

In conclusion, var. *canescens* is geographically, morphologically and chromosomally distinct from its relatives, *S. altissima* var. *altissima* and var. *gilvocanescens*, and I believe its recognition at the rank of species more adequately reflects its relationship to these taxa. Because the typification of Gray's name is somewhat problematic, and since the combination that would be created by elevating the rank of the varietal name is already occupied in *Solidago*, I have chosen to provide both a new name and a new type and paratypes (several being widely distributed) for this species.

Solidago juliae Nesom, *spec. nov.* TYPE: UNITED STATES. Texas: Kerr Co., along Guadalupe River on S side of Hwy 27, ca 1 mi E of jct with

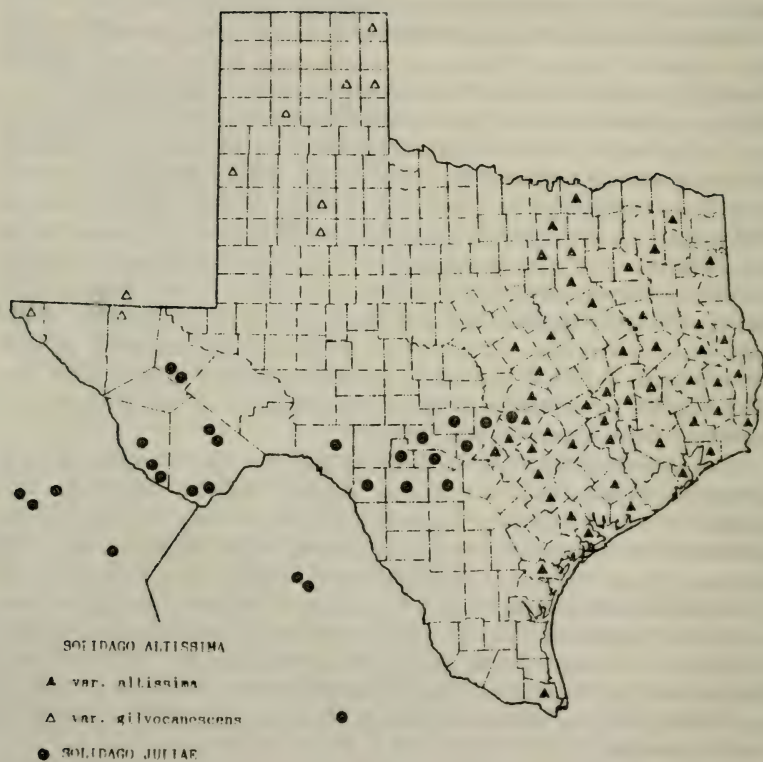


Figure 1: Distribution of the *Solidago canadensis* complex in Texas, with the complete distribution of *S. juliae*. All records except three from México are represented by specimens in LL-TEX.

Hwy 39 in Ingram, 23 Sep 1989, *Guy Nesom 7212* with Julia Nesom (HOLOTYPE: TEX; Isotypes: ANSM.ARIZ.ASU.CAS.COLO.DUR.F, GH,MEXU.MO.NCU.NMC,NY,RM.SMU.SRSC.UNM.US,WAT,WIS).

Solidago canadensis var. *canescens* A. Gray, Proc. Amer. Acad. Arts 17:197. 1882. TYPE: UNITED STATES. Southwestern Texas or southern New Mexico. Collections not cited by Gray, not seen but presumably at GH. *Solidago altissima* L. var. *canescens* (A. Gray) M.C. Johnston, Southw. Naturalist 14:372. 1970. Not *S. (Oligoneuron) canescens* (Rydb.) Friesner.

S. altissimae L. similis sed caulibus dense arcte villosi-tomentosis et foliis brevi-pilosulis utrinque pariter pubescentibus marginibus non-revolutis differt.

Plants (5-)10-25 dm tall, from short rhizomes. Stems densely, closely, and evenly villous-tomentose with very thin, whitish, crisped hairs. Leaves moderately to densely short pilose, with hairs sometimes somewhat ascending, equally pubescent above and beneath, densely arranged, lanceolate to narrowly lanceolate, the mid-cauline 5-8(-12) cm long, 5-10(-12) mm wide, (6-)7-10(-13) times longer than wide, little reduced upwards, 3 nerved, shallowly crenate or serrate to nearly entire. Heads 3.0-3.5 mm wide, secund on spreading to slightly secund branches in a large, pyramidal capitulescence; phyllaries oblong-lanceolate to oblanceolate or narrowly elliptic, with hyaline margins, glabrous or the margins apically ciliate, strongly graduated, the inner 2.8-3.5 mm long. Ray flowers 9-15, the corollas 3.0-3.2 mm long. Disc flowers 5-9, the corollas 2.8-3.0 mm long. Achenes 1.4-1.6 mm long, sparsely short strigose; pappus bristles as long as the disc corollas. Chromosome number, $n=9$ pairs.

Southwestern Texas on the southern part of the Edwards Plateau to the trans-Pecos region, northern Coahuila, and northeastern Chihuahua; along streams and lake edges, areas of grasslands to oak or oak-pine woodlands; ca 600-2200 m; flowering February-April, August-October(-November). At least in Texas and northern Coahuila, *Solidago juliae* is extremely predictable in habitat, occurring mostly in wet soil along the rocky edges of streams and rivers with permanent water. It should be expected in Hays, Comal, Bexar and Crockett counties, although there are no records from these in LL,TEX.

Additional collections examined: MÉXICO. Chihuahua: By streams near Chihuahua, 25 Sep 1885, *Pringle 338* (F,LL); valley near Chihuahua, 13 Sep 1886, *Pringle 1116* (MO); Presa Encinillas, 100 km E of Cd. Chihuahua [28° 14' N, 104° 08' W], 19 Oct 1974, *Rzedowski 32385* (TEX); Sta. Eulalia plains, 25 Sep 1885, *Wilkinson s.n.* (F,MU). Coahuila. Melchior Músquiz, edge of stream, 14 Oct 1963, *Latorre s.n.* (TEX); Músquiz Swamp, 15 Sep 1936. *Marsh 922* (TEX-2 sheets); 26 km E of Saltillo, Ojo Caliente, edge of pond in limestone-gypsum, 15 Aug 1979, *Wagner, et al. 4095* (MO).

UNITED STATES. Texas: Bandera Co., rocky riverbed of Sabinal River. Lost Maples Natural Area, 8 Oct 1974, *Snyder 260* (LL). Blanco Co., 6 mi S of Johnson City at jct of Hwys 290 and 281, at crossing of small creek, 29 Oct 1989, *Nesom 7219* (ANSM,ARIZ,ASU,CAS,DUR,ENCB,F,ILL,KSC,MEXU,MICH,MO,NCU,NMC,NY,RM,RSA,SMU,SRSC,SMU,TEX,UNM,US,UTC,WAT,WIS). Brewster Co.: Ridge Spring, ca 10 mi 8 of Marathon, 24 Sep 1927, *Cory 48478* (LL); 23 Sep 1938, *Cory s.n.* (TEX); 30 Jul 1938, *Warnock T547* (TEX-2 sheets); 16 Sep 1915, *Young s.* (TEX); around spring below the ranchhouse, Old Grapevine Hills Ranch, Big Bend Natl. Park, 12 Nov 1967, *Correll & Correll 35408* (LL); Cattail Falls and along stream, Big Bend Natl. Park, 9 Nov 1964, *Correll & Correll 30585* (LL). Gillespie Co., riverbank, 1 mi N of Wolf Creek crossing on Hwy 16, ca 8 mi N of Kerrville, 23 Sep 1989, *Nesom 7211* (ANSM,MO,NY,RM,SRSC,TEX,WAT). Kendall Co., rocky riverbanks [of Cibolo Creek], Boerne, 28 Sep 1917 *Palmer 12887* (TEX) and *12888* (TEX). Kinney Co., along stream by Hwy 90, 5 mi W of Bracketville, 11 Oct 1961, *Correll & Correll 24736* (LL). Medina Co., edge of Hondo Creek, 12 mi N of Hondo, 28 Oct 1952, *Correll 15218* (LL). Presidio Co.: shallow pools in Chorro Canyon, Big Bend Ranch, 14 Jun 1975, *Butterwick & Strong 950* (TEX); vicinity of waterfall in lower Arroyo Segundo, a tributary of Fresno Creek on the Big Bend Ranch, 1 Oct 1975, *Butterwick & Lamb 1733* (TEX); between Madril Ranch and falls in upper Madera Canyon, Bofecillas Mts. on the Big Bend Ranch, 19 Oct 1972, *Chiang, Wendt & Johnston 9696* (LL); wet soil among boulders in Capote Creek Canyon, just below Capote Falls, 2 Nov 1966, *Correll 34121* (LL). Real Co., crossing of West Frio River on Hwy 83, 2 mi NE of Leakey, 23 Sep 1989, *Nesom 7213* (ANSM,ARIZ,ASU,BAYL,CAS,CIIDIR,COLO,ENCB,F,GA,ILL,MICH,MO,NCU,NLU,NY,OBI,RM,RSA,SD,SMU,TAES,TEX,UTC,WAT,WIS,WTU). Reeves Co.: 0.8 mi E of Balmorhea, 2 Nov 1934, *Cory 12080* (TEX), 28 Sep 1942, *Cory 40560* (TEX); Balmorhea, 13 Sep 1931, *Whitehouse 8472* (TEX). Travis Co.: Watkins Ranch in NW corner of the county, 14 Oct 1950, *Tharp 51-495* (TEX). Uvalde Co., along Sabinal River, Utopia, 16 May 1954, *Johnston 54632* (TEX), 7 Oct 1917, *Palmer 12942* (TEX). Val Verde Co., along San Felipe Creek, near Del Rio, 8 Oct 1952, *Correll 14950* (LL); San Felipe Springs, near Del Rio, 18 Apr 1957, *Correll 15990* (LL); Del Rio, 1 Feb 1932, *Whitehouse 8471* (TEX).

The chromosome number of *Solidago juliae* is reported here for the first time. Plants from each of three populations of the southern Edwards Plateau (*Nesom 7211*-Gillespie Co., *7212*-the type from Kerr Co. and *7213*-Real Co.) showed numerous cells in late prophase and metaphase (meiosis I) with nine bivalents. Voucher specimens of these are deposited at TEX and duplicates are being distributed on exchange as noted above.

Over most of its range, *Solidago juliae* is relatively uniform in morphology. The most notable variants occur in the western part of its range. In north-

eastern Chihuahua the plants have slightly broader leaves with less pubescent upper surfaces than those in Texas and Coahuila. This perhaps is reflective of genetic input from *S. altissima* var. *gilvocanescens*. but as noted above. the latter appears to be completely absent or at least very rare in that area. In Presidio Co., the leaves of some plants are more sparsely pubescent with nearly adpressed hairs and most of the disc flowers are malformed with anthers abortive or absent. The pilose-tomentose stems and narrowly lanceolate leaves equally hairy above and below, however, place them with *S. juliae*. Finally, the collection from near Saltillo (*Wagner, et al.* 4095) is by far the southernmost for the species and has an unusually large number (20) of ray flowers.

Solidago juliae may be the progenitor of *S. gypsophila* Nesom, a narrow endemic restricted to the area of Cuatro Ciénegas, Coahuila (Nesom 1989a). The latter differs in its leaves with deeply recessed lamina and strongly protruding venation, dense, evenly hispidulous-hirtellous foliar pubescence, shorter phyllaries and fewer ray and disc flowers.

KEY TO THE TAXA OF THE *SOLIDAGO CANADENSIS* COMPLEX IN TEXAS

- 1. Stems densely and closely villous-tomentose; leaves densely and evenly short pilose above and beneath; plants of the Edwards Plateau and trans-Pecos Texas *S. juliae*
- 1. Stems short pilose to puberulent; leaves usually noticeably less hairy above than beneath and often darker colored above, with ascending-appressed hairs on the upper surfaces (2)
 - 2. Leaves with prominently revolute margins, the upper surfaces with stiff, ascending-appressed trichomes consisting of mostly no more than a short apiculus extending from a thick base; plants of the eastern third of Texas *S. altissima* var. *altissima*
 - 2. Leaves with the margins slightly thickened but not revolute, the upper surfaces with thin, elongate trichomes not strongly thickened basally; plants of the Panhandle and west central plains counties *S. altissima* var. *gilvocanescens*

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NEW COMBINATIONS REQUIRED FOR THE FLORA OF CENTRAL EASTERN UNITED STATES, III

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ABSTRACT

New combinations are provided for 23 plants in three families from the central eastern United States.

KEY WORDS: Nomenclature, floristics, eastern United States.

The following additional nomenclatural changes need to be made in the preparation of the Flora of Central Eastern United States (Maryland, Delaware, Virginia and West Virginia, including the District of Columbia). Other new combinations have been published in 1982 (*Phytologia* 50[7]:461-462) and 1987 (*Phytologia* 63[5]:410-412).

Gramineae

1. *Schizachyrium praematurum* (Fern.) Reed, *comb. nov.* BASIONYM: *Andropogon praematurus* Fern., *Rhodora* 42:413. 1940.
2. *Schizachyrium praematurum* forma *hirtivaginatatum* (Fern.) Reed, *comb. nov.* BASIONYM: *Andropogon praematurus* forma *hirtivaginatatus* Fern., *Rhodora* 44:383. 1942.
3. *Schizachyrium scoparium* forma *calvescens* (Fern.) Reed, *comb. nov.* BASIONYM: *Andropogon scoparius* var. *genuinus* forma *calvescens* Fern., *Rhodora* 45:350. 1943.
4. *Schizachyrium scoparium* forma *villosissimum* (Kearney in Scribn. & Ball) Reed, *comb. nov.* BASIONYM: *Andropogon scoparius* forma *villosissimus* Kearney in Scribn. & Ball, USDA Div. Agrost. Bull., 24:41. 1901.
5. *Panicum acuminatum* var. *villosum* (A.Gray) Reed, *comb. nov.* BASIONYM: *Panicum nitidum* var. *villosum* A.Gray, N. Amer. Gram. & Cyp., 2:111. 1835.

6. *Panicum acuminatum* var. *implicatum* (Scribn.) Reed, *comb. nov.*
BASIONYM: *Panicum implicatum* Scribn., USDA Div. Agrost. Bull., 11:43. 1898.
7. *Panicum acuminatum* var. *lindheimeri* (Nash) Reed, *comb. nov.* BASIONYM: *Panicum lindheimeri* Nash, Bull. Torrey Bot. Club, 24:196. 1897.
8. *Panicum acuminatum* var. *longiligulatum* (Nash) Reed, *comb. nov.*
BASIONYM: *Panicum longiligulatum* Nash, Bull. Torrey Bot. Club, 26:574. 1899.
9. *Panicum acuminatum* var. *densiflorum* (Rand & Redfield) Reed, *comb. nov.* BASIONYM: *Panicum nitidum* var. *densiflorum* Rand & Redfield, Fl. Mt. Desert, 174. 1894.
10. *Panicum acuminatum* var. *thurowii* (Scribn. & Smith) Reed, *comb. nov.* BASIONYM: *Panicum thurowii* Scribn. & Smith, USDA Agrost. Circ. 16:5. 1899.
11. *Panicum ovale* var. *addisonii* (Nash) Reed, *comb. nov.* BASIONYM: *Panicum addisonii* Nash, Bull. Torrey Bot. Club, 25:83. 1898.
12. *Panicum sabulorum* var. *patulum* (Scribn. & Merrill) Reed, *comb. nov.* BASIONYM: *Panicum nashianum* var. *patulum* Scribn. & Merrill, USDA Dept. Agrost. Circ. 27:9. 1900.
13. *Panicum sabulorum* var. *thinium* (Hitchc. & Chase) Reed, *comb. nov.* BASIONYM: *Panicum unciphyllum* var. *thinium* Hitchc. & Chase, Rhodora 8:200. 1906.
14. *Panicum strigosum* var. *puberula* Reed, *nom. nov.* Based on *Panicum leucoblepharis* Trin., Clav. Agrost., 234. 1822.

Panicum ciliatum Elliott, Sketch Bot. South Carolina & Georgia, 1: 126. 1816, not F. Maercklin, Schrift. Regensb. Bot. Ges., 1:332-334. 1792.
15. *Panicum strigosum* var. *glabrescens* (Grisebach) Reed, *comb. nov.* BASIONYM: *Panicum dichotomum* var. *glabrescens* Grisebach, Fl. Brit. W. Indies 553. 1864.
16. *Panicum dichotomum* var. *clutei* (Nash) Reed, *comb. nov.* BASIONYM: *Panicum clutei* Nash, Bull. Torrey Bot. Club, 26:569. 1899.
P. mattamuskeetense var. *clutei* (Nash) Fern., Rhodora 39:386. 1937.

17. **Panicum dichotomum** var. **tenue** (Mühl.) Reed, *comb. nov.* BASIONYM: *Panicum tenue* Mühl., Descr. Gram., 118. 1817.
18. **Panicum dichotomum** var. **ensifolium** (Baldwin ex Elliott) Reed, *comb. nov.* BASIONYM: *Panicum ensifolium* Baldwin ex Elliott, Sketch Bot. South Carolina & Georgia 1:126. 1816.

Cyperaceae

19. **Eleocharis obtusa** var. **engelmannii** forma **detonsa** (A.Gray) Reed, *comb. nov.* BASIONYM: *Eleocharis engelmannii* var. *detonsa* A.Gray in H. Patters., Cat. Pl. Illinois 46. 1876.
20. **Scirpus pendulus** forma **elongatus** (Eames) Reed, *comb. nov.* BASIONYM: *Scirpus lineatus* forma *elongatus* Eames, Rhodora 33:168. 1931.
21. **Scirpus microcarpus** forma **radiosus** (Fern.) Reed, *comb. nov.* BASIONYM: *Scirpus rubiotinctus* forma *radiosus* Fern., Rhodora 45:295. 1943.
22. **Carex striata** var. **erecta** (Dewey) Reed, *comb. nov.* BASIONYM: *Carex acuta* var. *erecta* Dewey, Amer. J. Sci., 10:265. 1825.
- Carex angustata* Boott, 1867.
- Carex stricta* var. *decora* L.H. Bailey, 1871.

Aquifoliaceae

23. **Ilex ambigua** var. **montana** forma **mollis** (A.Gray) Reed, *comb. nov.* BASIONYM: *Ilex mollis* A.Gray, Man. Bot. N. U.S., 5th ed. 306. 1880.

A NEW SPECIES OF *SENECIO* (*PSACALIOPSIS*) FROM
GUERRERO, MÉXICO

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ABSTRACT

Senecio paneroi B. Turner, a new species from near Chilpancingo, Guerrero, belonging to the *Psacaliopsis* group of *Senecio* (*sensu lato*) is described and illustrated.

KEY WORDS: Asteraceae, Senecioneae, *Senecio*, México.

Recent collections from field workers out of the University of Tennessee have produced the following novelty. The species belongs to the genus *Psacaliopsis* (*sensu* Robinson & Brettell (1974), but Turner & Barkley (in prep.) intend to place this in the section *Multipalmatii* of *Senecio* (which would also include the genus *Roldana* [Barkley 1985]).

Senecio paneroi B. Turner, *spec. nov.* (Figure 1). TYPE: MÉXICO. Guerrero: km 70-71 de la carretera Chilapa-Tlapa (E de Chilpancingo), 2 Nov 1986, José L. Panero, E.E. Schilling & B.E. Wofford 582 (HOLOTYPE: TENN).

Senecio purpusii Greenm. similis sed foliis puberulis lobis minoribus et capitulis numerosioribus (ca 10 vs 2-5) flosculis paucioribus (15-20 vs 20-50) differt.

Acaulescent perennial herbs to 60 cm high. Leaves peltate, the petiole attachment somewhat off center; petioles 5-9 cm long, sparsely arachnoid pubescent; blades 5-8 cm across, sparsely pubescent above, densely to moderately soft puberulent beneath, the margins with 8-10 major, but shallow lobes, or irregularly multilobate. Heads ca 10, radiate, borne upon a leafless puberulent purplish scape ca 42 cm long, the ultimate peduncles mostly 1.5-5.0 cm long. Involucres ca 10 mm high, the bracts ca 11, linear lanceolate, densely short glandular pubescent, the apices often purplish, acute, tufted. Receptacle plane. Ray florets ca 8, the ligules yellow, 10-12 mm long, 4-5 mm wide. Disk florets 15-20, the corollas yellow, ca 7 mm long, the lobes ca 1.5 mm long, the

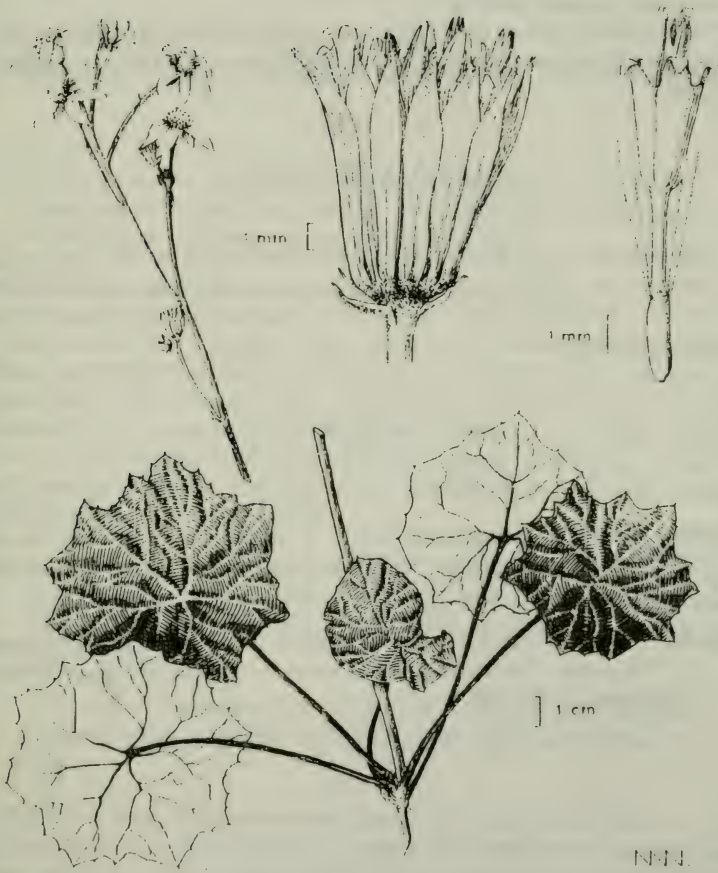


Fig 1 *Senecio panzeri*, from holotype

tube ca 2.5 mm long. Achenes (immature) sparsely pubescent, ca 3 mm long, the pappus of numerous white barbellate bristles ca 5 mm long.

According to label data, the species is "Creciendo en un bosque de encino y pinos, muy aislados entre se."

The species is named for its principal collector, doctoral candidate at the University of Tennessee, working with *Viguiera* under the direction of Prof. E. Schilling.

ACKNOWLEDGMENTS

I am grateful to Dr. Edward Schilling for the loan of the Mexican holdings of *Senecio* from TENN, to Guy Nesom for the Latin diagnosis and to both him and Dr. Ted Barkley for a review of the manuscript itself. Nancy Webber provided the illustration.

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A NEW *ERIGERON* (ASTERACEAE: ASTEREA) FROM
TAMAULIPAS, MÉXICO

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ABSTRACT

A new species, *Erigeron cieloensis*, is described from the Gómez Farías region of Tamaulipas, México. It is closely related to *E. basilobatus*, a more widespread species of the eastern sierra.

KEY WORDS: *Erigeron*, Asteraceae, Astereae, México.

Three collections of *Erigeron* from the Gómez Farías region of Tamaulipas, México, previously identified as *Erigeron basilobatus* S.F. Blake, are now recognized as an undescribed species. The two taxa are similar, but numerous collections of *E. basilobatus* have been made in the last 5-10 years, allowing it to be more accurately delimited. All of the known collections of the new species were made by Dr. Al Richardson, whose collections from that area have provided numerous other novelties.

Erigeron cieloensis Nesom, *spec. nov.* TYPE: MÉXICO. Tamaulipas: Mpio. Gómez Farías, Rancho del Cielo, above Olla de Nubes, [oak to pine-oak woods, 1800-2100 m.,] 22 Jul 1968, A. Richardson 776 (HOLOTYPE: TEX!).

Erigeron basilobatus S.F. Blake *similis sed caulibus et foliis strigosis, foliis marginibus ciliatis, et setis pappo paucioribus differt.*

Perennials from fibrous roots and slender rhizomes. Stems 20-45 cm tall, with prominent orange-yellow ribs, strigose with antrorsely appressed hairs 0.3-0.5 mm long. Leaf lamina sparsely strigose, the margins ciliate with thick based, upturned hairs with orange crosswalls, the basal leaves in persistent rosettes, spatulate, 2-4 cm long, with blades ovate to obovate, 1-3 cm wide, with 4-6 pairs of mucronulate teeth, sharply attenuate to a narrow petiole, half the leaf length, cauline leaves restricted to the lower half of the stem, clasping, becoming lanceolate upward. Heads 10-12 mm wide, on long, naked peduncles; phyllaries thin, 6-7 mm long, lanceolate, with 3, parallel, orange veins, in 3-4

series of even length. Ray flowers 90-120, the corollas white, 13-15 mm long with ligules 1.0-1.3 mm wide, not coiling or reflexing. Disc corollas 3.0-4.0 mm long, slightly constricted in the lower 1/4, not indurated or inflated, the 5 lobes deltate; style branches with shallowly deltate to shallowly triangular collecting appendages 0.1-0.2 mm long. Achenes compressed, with 2, orange nerves, mature size not seen; pappus of 15-18 bristles, with a few outer setae.

Additional collections examined: MÉXICO. Tamaulipas: Type locality, 4 Jul 1968, *Richardson 568* (TEX); 22 Jul 1968, *Richardson 781* (TEX).

Erigeron cieloensis is closely similar to *E. basilobatus*, and the two can be justifiably regarded as sister species. Both have similar habits, prominently ribbed stems, similar leaf morphology and arrangement, heads on long, naked peduncles, 3 veined phyllaries, and long ray corollas. Both taxa appear to be very constant in their morphology, differing by the features summarized in the following couplet.

1. Stems moderately pilose with deflexed hairs 0.5-1.1 mm long; leaf lamina hispid-pilose, the margins not with differentiated cilia; pappus bristles 26-32 *E. basilobatus*
1. Stems sparsely strigose with antrorsely appressed hairs 0.3-0.5 mm long to nearly glabrous; leaf lamina sparsely strigose, the margins with prominent, thick based, upturned cilia; pappus bristles 15-18 ... *E. cieloensis*

Erigeron cieloensis appears to be a narrow endemic, restricted to the Gómez Farías area (Map 1), while *E. basilobatus* is more widespread. In addition to the localities mapped for *E. basilobatus*, it is known from Puebla by a single collection (Puebla, 1.3 mi N of the Tlaxcala state line, 2 Sep 1961, *De Jong 1219* [TEX]).

Essentially the same pattern of geographic distribution found in *Erigeron basilobatus*-*E. cieloensis* can be seen in other species pairs, with the narrow endemic in the Gómez Farías region: *Macromeria notata* I. M. Johnston - *M. alba* Nesom (Nesom 1989); *Omphalodes cardiophylla* A. Gray - *O. richardsonii* Nesom (Nesom 1988); *Eupatorium reyrobinsonii* (B. Turner) B. Turner - *E. richardsonii* (B. Turner) B. Turner (Turner 1983); *Verbesina oreophila* Woot. & Standl. - *V. richardsonii* B. Turner (Turner 1985). Other known endemic species of the Gómez Farías region appear to have their closest relatives distributed to the south.



Map 1. Distribution of *Erigeron basilobatus* and *E. cicloensis*. See text for additional record of *E. basilobatus*.

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NOMENCLATURAL NOTES FOR THE NORTH AMERICAN FLORA. I.

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ABSTRACT

Nomenclatural clarifications are provided for names in *Ilex*, *Dentaria*, *Teucrium*, *Nuphar*, *Spiraea*, *Synthyris* and *Calibrachoa*. New combinations are made where necessary.

KEY WORDS: Nomenclature, North America, floristics.

In preparation of a revised *Synonymized Checklist of the Vascular Flora of the United States, Canada and Greenland* (Kartesz 1990), a number of nomenclatural notes are deemed necessary. These notes will appear in subsequent publications. This is the first of a series of such notes.

AQUIFOLIACEAE

Ilex montana Torr. & Gray, a manuscript name, was validated by Gray (1848) in his *Manual of Botany*. In 1856, Gray used the name *I. monticola* Gray and cited *I. montana* as a synonym. Both names are based on the same type; hence, the name *I. monticola* is superfluous. The names *I. mollis* Gray and *I. beadlei* Ashe are considered conspecific with *I. montana*, with the last name representing the earliest valid name in this complex.

Subsequently, these four names were treated at infraspecific rank by various authors (refer to Wunderlin & Poppleton 1977). Alphonso Wood (1870) published the combination *I. amelanchier* M.A. Curtis var. *monticola* Wood, to refer to a member of this complex. Although Wood did not cite Gray's reference for this varietal epithet, it has been attributed to "(Gray) Wood" by later authors, such as Wunderlin & Poppleton (*l.c.*) and Little (1979), who suggested that Wood had based his variety *monticola* on Gray's species *montana*. However, Wood described the variety and provided a type, therefore his epithet *monticola* is not tied to Gray's *montana*. Wunderlin & Poppleton transferred the complex to *I. ambigua* (but excluding *I. amelanchier* var. *amelanchier*) and made a new combination: *Ilex ambigua* (Michaux) Torr. var. *monticola* (Gray) Wunderlin & Poppleton. This new combination is illegitimate, since it is based on an epithet never described by Gray. However, it

is effectively published and prevents the use of the combination *I. ambigua* var. *monticola* based on Wood's epithet, which would have had priority at the variety level for the taxon in question. Therefore, the combination *I. ambigua* var. *monticola* (Wood) cannot be used because it would be a later homonym of the combination of Wunderlin & Poppleton. The next earliest combination involving a variety within what is treated here as *I. ambigua*, is *Ilex montana* var. *mollis* (Gray) Britton (1890). This combination created the autonym *Ilex montana* var. *montana*. Since autonyms have priority over the names which cause them to be formed, the oldest valid varietal name in this complex is *montana*, and accordingly Ahles' combination is correct at the varietal rank for this complex:

Ilex ambigua var. *montana* (Gray) Ahles, J. Elisha Mitchell Sci. Soc., 80:173. 1964.

BRASSICACEAE

E.L. Greene transferred *Dentaria californica* Nutt. and *D. integrifolia* Nutt. to the genus *Cardamine*, as *C. californica* (Nutt.) Greene (Greene 1891) and *C. integrifolia* (Nutt.) Greene (Greene 1886-87). Unfortunately, the latter name is a later homonym of *C. integrifolia* Gilib. (Fl. Lituan. 2:68. 1782) and hence illegitimate. If *C. californica* and *C. integrifolia* (Nutt.) Greene are considered conspecific, then the correct name for this complex is *C. californica*. Kartesz (1990) recognizes three varieties in *C. californica*: var. *californica* (incl. *Dentaria californica* var. *integrifolia* (Nutt.) Detling), var. *pachystigma* O.E. Schulz and var. *sinuata* (Greene) O.E. Schulz.

LAMIACEAE

Teucrium occidentale Gray was published in 1878 (Syn. Fl. N. Amer. 2[1]:349), while *T. boreale* Bicknell appeared in 1901 (Bull. Torrey Bot. Club 28:171). *Teucrium boreale* was reduced to a variety in 1908, as *T. occidentale* var. *boreale* (Bicknell) Fern. (Rhodora 10:85). Likewise (in 1946), *T. occidentale* was also reduced to varietal status as *T. canadense* L. var. *occidentale* (Gray) McClint. & Epl. (Brittonia 5:499). Shinnars (1963) considered that a circumscription of a variety in *T. canadense* would include both *T. boreale* and *T. occidentale*. Shinnars chose the epithet *boreale* for this variety of *T. canadense*. He based his view on the belief that at varietal rank, *boreale* has priority over *occidentale*, since *T. boreale* was reduced to a variety prior to that of *T. occidentale*. Hence, Shinnars made a new combination: *T. canadense* var. *boreale* (Bicknell) Shinnars.

Although acceptable at the time, due to changes in the Code, Shinnars' interpretation of the situation is incorrect according to the present Code of Botanical Nomenclature. Although *T. occidentale* var. *boreale* was published

prior to *T. canadense* var. *occidentale*. publication of the combination *T. occidentale* var. *boreale* created the autonym *T. occidentale* var. *occidentale*, which has priority over var. *boreale*. Therefore, the correct name for the plant represented by the types of *T. boreale* and *T. occidentale*, when recognized as a variety of *T. canadense*, is *T. canadense* var. *occidentale*. Soil Conservation Service (1982) also took a similar stand in accepting *T. canadense* var. *occidentale* as the correct name for this complex.

NYMPHAEACEAE

E.O. Beal (1956) treated *Nymphaea macrophylla* Small as a subspecies of *Nuphar luteum* (L.) Sibth. & Sm.: *Nuphar luteum* ssp. *macrophyllum* (Small) Beal. R.B. Kaul (1986) followed Beal's treatment and cited *Nymphaea advena* Ait. as a synonym. With the inclusion of *Nymphaea advena* as a synonym of this subspecies, a new combination is necessary. The necessity of the new combination is caused by the combination of *Nymphaea advena* ssp. *erythraea* Miller & Standley in 1912, thus creating the autonym *Nymphaea advena* ssp. *advena*, which will have priority at the subspecies level. Therefore, the new combination is proposed here to supersede *Nuphar luteum* ssp. *macrophyllum* (Small) Beal.

Nuphar luteum ssp. *advenum* (Ait.) Kartesz & Gandhi. *comb. nov.* **BA-SYONYM:** *Nymphaea advena* Ait., Hort. Kew., Ed. 1. 2:226. 1789.

Nymphaea advena ssp. *erythraea* Miller & Standley, Contr. U.S. Natl. Herb. 16:91. 1912.

Nymphaea macrophylla Small, Bull. Torrey Bot. Club 25:465. 1898.
Nymphaea advena var. *macrophylla* (Small) Miller & Standl., Contr. U.S. Natl. Herb. 16:89. 1912. *Nymphozanthus advena* (Ait.) Fern. var. *macrophylla* (Small) Fern., Rhodora 21:186. 1919. *Nuphar luteum* ssp. *macrophyllum* (Small) Beal, J. Elisha Mitchell Sci. Soc. 72:332. 1956.

ROSACEAE

The name *Spiraea densiflora* has been attributed to Nutt. (Greenman 1898; Jepson 1936), Nutt. ex Torr. & Gray (Hitchcock & Cronquist 1961), or Nutt. ex Greenm. (Soil Conservation Service 1982). Torrey & Gray (1940) discussed this Nuttalian manuscript name in *S. betulifolia*. Their discussion implied that they treat *S. densiflora* as a synonym of *S. betulifolia* (c.f. Greenman: Jepson). Hence, *S. densiflora* cannot be attributed to Torrey & Gray. Greenman's usage of this name validated it. Hence, the correct authority for *S. densiflora* is Nutt. ex Greenm. For *S. densiflora*, the following two names have been treated as synonyms: *S. betulifolia* Pallas var. *rosea* Gray and *S. arbuscula* Greene.

In Kartesz (1990), the *S. densiflora* complex will be recognized as a variety of *S. splendens* Baumann ex K. Koch (Monats. Ver. Bef. Gart. Preuss. 18:294. 1875), and a new combination is proposed here.

Spiraea splendens Baumann ex K. Koch var. *rosea* (Gray) Kartesz & Gandhi, *comb. nov.* BASIONYM: *Spiraea betulifolia* Pallas var. *rosea* Gray, Proc. Amer. Acad. Arts 8:381. 1873.

Spiraea arbuscula Greene, Erythea 3:63. 1895.

Spiraea densiflora Nutt. ex Greenm., Bot. Gaz. 25:261. 1898.

SCROPHULARIACEAE

Synthyris stellata Pennell, found in Oregon and Washington, is closely related to *S. missurica* (Raf.) Pennell. C.L. Hitchcock, *et al.* (1959) remarked that *S. stellata* (mentioned as forms of *S. missurica* found in and about Columbia Forge, OR) was distinct with more sharply toothed leaves and better developed bracts beneath the inflorescences. But C.L. Hitchcock, *et al.* considered these traits to represent only slight variations and treated *S. stellata* as a synonym of *S. missurica*. However, Soil Conservation Service (1982) considers these two species as distinct.

We suggest that *S. stellata* be considered as a subspecies of *S. missurica* and propose a new combination.

Synthyris missurica ssp. *stellata* (Pennell) Kartesz & Gandhi, *comb. nov.* BASIONYM: *Synthyris stellata* Pennell, Proc. Acad. Nat. Sci. Philadelphia 85:94. 1933.

SOLANACEAE (Contributed by W.G. D'Arcy, Missouri Botanical Garden)

When he described the genus *Petunia* in 1803, A.L. Jussieu also described two species, *P. parviflora* and *P. nyctaginiflora*. The first of these, *P. parviflora*, was selected as the lectotype species by several later botanists, for example Cabrera (1954: 417), most of whom worked independently but probably had in mind the monograph of Fries (1911). Fries placed *P. parviflora* into his subgenus *Eupetunia* (or "true" *Petunia*). His other species, *P. nyctaginiflora*, which is now correctly known as *P. axillaris* (Lam.) B.S.P., was placed into a second subgenus *Pseudonicotiana*.

Until recently, *Petunia parviflora* and *P. nyctaginiflora* were considered to be congeneric, and to embrace *Petunia hybrida*, or *Petunia violacea*, the garden petunia. In a series of papers which looked at chromosomes, attempted hybridizations, and examined gross foliage and floral morphology, workers in the Netherlands (Wijsman & DeJong 1985) have concluded that *Petunia parviflora* and *P. axillaris* are not congeneric, and that one of them must be placed in a different genus.

A proposal was made (Wijnands, *et al.* 1986) under the International Botanical Code to formally conserve *P. nyctaginiflora* A.L. Juss. as a new type for *Petunia*. Although this contradicts the traditional practice of adherence to the first lectotypification, the Committee for Spermatophyta (Brummitt 1989: 301) has chosen by a vote of 10 to 1 to recommend this conservation action. "The proposal is to conserve the generic name . . . so that the common garden *Petunia* still belongs to *Petunia*."

It is almost (but not absolutely) unknown for the Committee's recommendations to be overruled, and it is likely that the Netherland workers are correct in their separation of the traditional *Petunia* into the two genera. Therefore, consideration of a new correct name for the "Wild *Petunia*" or "Seaside *Petunia*" (Correll & Johnston 1970: 1404) is in order. The next earliest generic name is *Calibrachoa*, described by Llave & Lex. in 1825. The paper with their generic description included an excellent drawing of the plant they called *C. procumbens* Llave & Lex. The earliest name for this species is *Petunia parviflora* A.L. Juss., and as the combination of this name in *Calibrachoa* seems not yet to have been made, it is made here.

***Calibrachoa parviflora* (Juss.) D'Arcy, *comb. nov.* BASIONYM: *Petunia parviflora* A.L. Jussieu, Ann. Mus. Natl. Hist. Nat. 2:216. 1803.**

Calibrachoa procumbens La Llave & Lexarza, Novorum vegetabilium descriptiones fasc. 2:3. 1925. [fasc. 2: first set of pagin., 10; repr. in *Naturaleza* 5: Apendice. 1881].

Other synonyms are also known for this species and other transfers from *Petunia* into *Calibrachoa* will be needed consequent nomenclatural actions noted above, but they will not be presented here.

This species occurs in Texas, and other southern states as a low growing paludal weed bearing little resemblance to the garden petunia. It ranges at least as far south as central Argentina, and it is probably a native of South America.

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CLARIFICATIONS AND LECTOTYPIFICATIONS OF SOME NORTH AMERICAN *DELPHINIUM*

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ABSTRACT

Clarifications of type specimens and lectotypifications are provided for 56 epithets of *Delphinium* in North America. These names will be used in several forthcoming floristic works, either to designate various taxa or in synonymy.

KEY WORDS: Nomenclature, taxonomy, North America, floristics.

Clarifications of the type specimens for fifty six epithets pertaining to *Delphinium* from North America are necessary, in order that the names represented by the types may be properly applied. The names treated in this paper apply primarily to plants that grow in California and this work was undertaken as part of a treatment of *Delphinium* for the forthcoming revision of the *Manual of the Flora of California*. Several epithets not relating to California plants are also included as these will be used for an upcoming treatment of *Delphinium* for the *Flora of North America*. The listing is alphabetical by species epithet and within species, alphabetical by infraspecific epithet.

Delphinium alabamicum Kral, Side 6:250. 1976. Type: UNITED STATES. Alabama, Franklin County, ca 5 mi S Russellville by US 43/Alabama 17, limestone glade, 26 May 1970, *R. Kral 39113* (LECTOTYPE [here designated]: US 2825960!; Isotypes: ALAB,C!,MO!,NY!,PAC!,TENN!,UC!,US-2!,VDB!).

Kral stated with his description of *Delphinium alabamicum*, that the type specimen was at US. In a search of the holdings of *Delphinium* at US, three sheets of this collection were found. The one showing the most superior quality of preservation of the features of the description is chosen as the lectotype.

Delphinium alatum A. Nelson, Amer. J. Bot. 32:286. 1945. Type: UNITED STATES. Alaska, Toklat River, near Alaska Road Commission Cabin, Mount McKinley National Park, 10 August 1939, A. & R. Nelson 4093 (LECTOTYPE [here designated]: RM 184985!; Isotypes: GH!, ILL!, US!).

Nelson (1945) cites the collection indicated above with his description, but does not indicate a herbarium in which to find it. Since Nelson was based in Laramie at the time he collected this plant, the logical starting point in searching for specimens of this collection was RM. A sheet of this collection was found there, along with three others in other herbaria. Examination of the four sheets of the type collection discovered so far, shows that each has either "TYPE" or "ISOTYPE" in the upper right hand corner of the label. These notations are in typescript and were apparently placed as the labels were being prepared before distribution of the specimens. The specimen at RM is the only one with the notation "TYPE" rather than "ISOTYPE," and is therefore taken as the lectotype. In addition, the specimen at RM closely matches the description.

Delphinium alpestre Rydberg, Bull. Torrey Bot. Club 29:146. 1902. Type: UNITED STATES. Colorado, mountains NW of Como, 31 July 1895, C.S. Crandall & J.H. Cowan 1948 (HOLOTYPE: CS!; Isotype: NY [frag-mentary]!).

In his original description of *Delphinium alpestre*, Rydberg cites the collection number as 1848. A *Delphinium* specimen collected by Crandall & Cowan bearing this collection number could not be located in any of the herbaria examined. It seems reasonable to assume that an error was made in the original publication, so that the collection number was published incorrectly. This view is further supported by the fact that the specimen in CS bears Rydberg's annotation label, identifying the specimen as *D. alpestre* and matches the locality data given with the description.

Delphinium andersonii A. Gray, Bot. Gaz. 12:53. 1887. Based on citation of *D. menziesii* DC., in Watson, *Botany of the Clarence King Expedition* "as to Nevada plant" (non *D. menziesii* DeCandolle) and *D. decorum* var. *nevadense* Wats., *Geological Survey of California-Botany* 1:11. 1880. Not *D. decorum* var. *nevadense* sensu Ewan (1945, p. 116). LECTOTYPE [here designated]: UNITED STATES. Nevada, Trinity Mountains, May 1868, S. Watson 39 (GH!); Isotype: (US!).

Ewan (1945, p. 194) had previously designated a lectotype for *Delphinium andersonii* (UNITED STATES. Nevada, near Carson City, 1865. C.L. Anderson 172 [GH!]). However, Gray (1887) clearly indicated that his new combination was based on *D. menziesii* (sensu Watson) of the *Botany of the King*

Expedition and part of *D. decorum* var. *nevadense* Wats. of the *Botany of California*. Gray cited no specimens with his description. Watson (1871), in his discussion of what he recognized as *D. menziesii*, cites his number 39 as typical of the plant, with his number 40 having pink flowers and number 41 with double flowers. Therefore, *Watson 39* would seem to be the logical lectotype. The choice of lectotype is based on the best match with Watson's original concept of *D. menziesii* (1871, p. 11), both by his statements in the protologue and the description of the plant. In addition, since the specimen was at GH, Gray would have had access to it in order to use it as a basis for his *D. andersonii*.

Delphinium apachensis Eastwood, Proc. California Acad. Sci., ser. 4 20:142. 1931. Type: UNITED STATES. Arizona, along road from Apache Lodge to Packard, near Roosevelt Dam, 12 May 1929, A. Eastwood 17144 (HOLOTYPE: CAS 167759!).

Originally published as *Delphinium apachensis*, but may be treated as an orthographic error and altered to *D. apachense*. Ewan cites the type as having been collected in Gila County. Roosevelt Dam is on the border between Gila and Maricopa counties.

Delphinium armeniacum Heller, Leaf. West. Bot. 2:219. 1940. Type: UNITED STATES. California, Lassen County, about a mile E of Fredonyer Pass, between Westwood and Susanville on St. Rt. 36, sparsely wooded dry slope, 5600 ft, 4 June 1938, A.A. Heller 15149 (HOLOTYPE: BKL; Isotypes: CAS!, DS!, ILL!, JEPS!, MO!, NY!, POM!, RSA!, UC!, US!, WTU-3!). Not *D. armeniacum* Stapf ex Huth, Bot. Jahrb. Syst. 20:329. 1895.

The location of the holotype is listed here as BKL, even though Heller referred to the holotype location as "Heller Herbarium." According to Stafleu & Cowan (1979), the Heller Herbarium is at BKL. Isotypes that have been examined appear to be hybrid derivatives of *Delphinium nudicaule* (of which *D. armeniacum* Heller is a synonym) and *D. nuttallianum*. Both taxa grow near the type locality of *D. armeniacum* Heller and putative hybrids have been seen there by the present author.

Delphinium burkei Greene, Erythea 2:183. 1894. Type: UNITED STATES. Idaho, Snake Country, 11 July, J. Burke (LECTOTYPE [here designated]: K 8803!; Isotype: K!).

Greene's description merely cites Burke's collection from Snake Country, probably Idaho. Ewan (1945) cites the type as being in K. Two sheets with the proper data were found in K. Further, the two sheets in K had apparently been studied by both Gray and Greene, as they had each annotated the specimens. Greene (1894) mentions in his description of *Delphinium burkei*, that Gray had referred to Burke's specimens as *D. andersonii* (along with some further, not too subtle comments about Gray's knowledge of the genus and region). Indeed, the specimens at K are annotated as *D. andersonii* in Gray's hand and *D. burkei* in Greene's. Thus, Ewan's statement that the type specimen was to be found in K was accurate. However, a lectotype is required to be designated from between those two. The sheet numbered 8803 is chosen as the lectotype because of its better exhibition of the features noted in the description.

Delphinium californicum Torrey & A. Gray, *Flora of North America* 1:31 1838. HOLOTYPE: UNITED STATES: California, *D. Douglas* (LECTOTYPE [Ewan 1945, p. 145]: GH!; Isotypes: BM-2!, K-2!, NY!).

The type specimens of *Delphinium californicum* were most likely taken from near San Francisco in late May of 1832. This may be deduced by matching Douglas' travels as summarized by McKelvey (1955), with the distribution and phenology of *D. californicum*. The specimens of the type collection are in an early stage of flowering, normally seen near the end of May in most years. Morphologically, the plants match populations from the San Francisco area somewhat better than those from the Monterey area. However, the variation in this species is more pronounced perpendicular to the coast than along the coast, such that plants from Monterey and San Francisco will look more alike than will plants from San Francisco and Oakland. It is possible that Douglas could have taken the type of *D. californicum* from the Monterey area in 1831, but according to the summary of his travels that spring, he was in Santa Barbara at the time when *D. californicum* near Monterey should have been in the stage of development seen in the type collection.

Delphinium californicum Torrey & A. Gray var. *interius* Eastwood, Leaflet West. Bot. 2:137. 1938. Type: California, San Joaquin County, Hospital Canyon, 24 May 1938, A. Eastwood & J.T. Howell 5796 (LECTOTYPE [here designated]: CAS 259949!; Isotypes: CAS-2!, F!, GH!, JEPS!, K!, NY!, POM!, UC!, US!).

Three sheets at CAS were cited as types with the original description, each probably part of a different individual. The lectotype is chosen on the basis of its match with the description and the fact that it is in an intermediate stage

of development, thus showing the largest number of features of the taxon (one of the other specimens is entirely in fruit and the other has been damaged).

Delphinium canmoreense Rydb., *Flora of the Rocky Mountains*. 312 (combination and description), 1060 (type citation). 1917. Type: CANADA. Alberta, Canmore, Rocky Mountains, 1 July 1885, J. Macoun (HOLOTYPE: NY!).

Rydberg cited the type as from British Columbia, but Canmore is in the province of Alberta and plants similar to the type of *Delphinium canmoreense* are found in the area of Canmore, Alberta.

Delphinium cardinale Hooker, Curtis' Bot. Mag. 11:t. 4887. 1855. Type: described from plants grown by Veitch in the Exeter and Chelsea Exotic Nurseries from seed collected in California by W. Lobb (LECTOTYPE [here designated]: K! [the specimen bearing parts of two inflorescences—one of them branched—and two leaves, with the citation "*Delphinium cardinale*, Hook. Bot. Mag. t. 4887, Cult. California."])).

Four specimens (all at K) have been seen that could possibly be construed as types. One is a specimen collected by Lobb, near San Bernardino, California. This probably is the voucher for the seed collection from which garden plants were grown, but since the description states that the species was described from cultivated material, Lobb's specimen must be eliminated as a type. The illustration accompanying the description appears as if it may be a composite from all three of the other specimens. Choice of the lectotype was based on the fact that it matches more features of the illustration and closely follows the written description.

Delphinium cardinale var. *angustifolium* Huth, Bot. Jahrb. Syst. 20:473. 1895. LECTOTYPE (here designated): UNITED STATES. California, San Diego County, Solidad, 1875, E.J. Palmer 7 (G-BB!); Isotypes: BM!, F!, GH!, NY!.

Ewan (1945, p. 190) had previously designated a different specimen (i.e. UNITED STATES. California, San Bernardino, May 1881, S.B. Parish & W.F. Parish 609 (G-BB!)) as the lectotype. However, Ewan's choice may be superseded for two reasons. First, by his own admission, Ewan chose this specimen because it was the first listed by Huth (1895). At the time when Ewan completed his synopsis of the North American species of *Delphinium*, it was common practice to assume the first of a list of specimens provided by an

author of a new name was the one that the author meant as "the type." Ewan consistently followed the "first cited specimen as the type" practice throughout his work. In some cases, this has fortuitously resulted in selection of the most logical lectotype that could have been chosen using any other criteria. In these cases, the present author has merely cited Ewan's selection as a lectotype, even though Ewan rarely used this term in his 1945 paper. Being a mechanical means of selection, this choice is in violation of Art. 8.1 of the current *International Code of Botanical Nomenclature*. Second, Huth's listing of specimens immediately below the description of *Delphinium cardinale* var. *angustifolium* is a listing of specimens of *D. cardinale* (both varieties recognized by Huth). This pattern is followed throughout Huth's (1895) work, only rarely did he designate certain specimens as representative of his newly named varieties. Therefore, any of the specimens in Huth's listing could potentially be types for *D. cardinale* var. *angustifolium*. These include Parish & Parish 609 (which is typical *D. cardinale*) which Huth indicated was in G-BB!, Parish & Parish (collected in 1882) which Huth indicated was in B,LE and his private herbarium (I have seen none of these), Palmer 7 (said by Huth to be in G-BB!) and an Orcutt collection from Baja California in 1886 (indicated to be in G-BB). The Palmer specimen was chosen due to its close match to the description given by Huth. Duplicates of the Orcutt collection seen at F,NY and WIS also fall within the boundaries of the description of *D. cardinale* var. *angustifolium*. However, since the Orcutt specimen purported to be at G-BB could not be located during my visit and the Palmer specimen is perfectly suitable, the Palmer specimen was chosen.

Delphinium coelestinum Rydb., Bull. Torrey Bot. Club 39:320. 1912. Type: UNITED STATES. Utah, southern part of state, 1877, E.J. Palmer 10 (HOLOTYPE: NY!; Isotypes: CAN,US!).

Ewan (1936) clearly explains certain difficulties with the numbering of Palmer's specimens, such that the appropriate collection number for the type should be 10 and not 11 as cited by Rydberg (1912). Not *Delphinium coelestinum* Franchet, J. Bot. (Morot) 8:276. 1894. *Delphinium coelestinum* Rydberg was replaced by *D. amabile* Tidestrom, Contr. U.S. Natl. Herb. 25:207. 1925.

Delphinium cuyamaca Abrams, Bull. Torrey Bot. Club 32:538. 1905. Type: UNITED STATES. California, San Diego County, borders of Cuyamaca Lake, grassy slopes, 1550 m, 26 June 1902, L. Abrams 3888 (LECTO-TYPE [Ewan 1945, p. 175]: DS!; Isotypes: BM!,CAN,F!,G!,GH!,K!,MO!,NY!,P!,PH!,UC!,US!,Z-2!).

Ewan (1945, p. 175) cited the DS specimen as the "type." However, Abrams did not specify a herbarium for storage of the type with his original description, therefore, there is no holotype. Consequently, Ewan's choice of the specimen at DS is a lectotypification. As a point of interest for future workers, and to avoid any possible confusion, Ewan annotated (in 1933) the sheet at DS as an isotype.

Delphinium decorum var. *nevadense* Wats., in Brewer & Watson, *Geological Survey of California-Botany* 1:11 (1880). LECTOTYPE [here designated]: UNITED STATES. Nevada, Trinity Mountains, May 1868, *S. Watson* 39 (GH!); Isotype: (US!).

Ewan (1945, p. 116) had previously designated a lectotype as: UNITED STATES. California, above Cisco, 1873, *H.N. Bolander* (GH!). However, Watson (Brewer & Watson 1880a) clearly indicated that *Delphinium decorum* var. *nevadense* was based on *D. menziesii* (sensu Watson) of the *Botany of the Clarence King Expedition*. Ewan's lectotype is therefore superfluous. Watson (1871), in his discussion of what he recognized as *D. menziesii*, cites his number 39 as typical of the plant, with his number 40 having pink flowers and number 41 with double flowers. The choice of lectotype is based on the best match with Watson's original concept of *D. menziesii* (1871, p. 11), both by his statements in the protologue and the description of the plant.

Delphinium decorum var. *racemosum* Eastwood, Bull. Torrey Bot. Club 28:671. 1901. LECTOTYPE [here designated]: UNITED STATES. California, San Mateo County, Stanford Heights, April 1894, *A. Eastwood* (CAS 235!).

Chosen from among several specimens listed with the original description. The choice was made on the basis of its match with the description and the fact that it has a handwritten designation as the type and part of the discussion from Eastwood's paper repeated. These are apparently in Eastwood's hand. The type of this variety appears to represent a backcross of a hybrid between *Delphinium patens* and *D. decorum* into a *D. decorum* population.

Delphinium diversifolium Greene, Pittonia 3:93. 1896. LECTOTYPE [here designated]: UNITED STATES. Nevada, Elko County, Ruby Range, Holborn Station, 16 July 1896, *E.L. Greene* (ND-G 3205!; Isotype: ND-G 3203!).

Greene cited no specimens when describing his new species, merely stating that it was "frequent in subalpine moist meadows among the mountains about the headwaters of the Humboldt River in eastern Nevada." Ewan (1945, p. 115) cited the "type" as: UNITED STATES. Nevada, Elko County, from near Holborn Sta., 15-16 July 1896, *E.L. Greene* (ND-G 3201!, 3202 and 3206!). Since Ewan did not designate a single specimen as a lectotype, one must still be chosen. Upon examination of specimens at ND-G, five specimens were located that could serve as types for this name. Two of the sheets mentioned by Ewan (3201 and 3206) were found in the folder marked *Delphinium diversifolium*. In addition, 3203, 3204 and 3205 were found in the same folder. Specimens from all five sheets were collected by Greene at Holborn Station. Sheets 3201, 3204 and 3206 were collected 15 July 1896 and were apparently the specimens referred to by Ewan (even though one of the numbers is different than cited by him). Sheets 3203 and 3205 were collected on 16 July 1896. Sheets 3203 and 3205 bear a hand written (apparently Greene's) citation of the publication of *D. diversifolium*. The other three sheets lack this notation. Therefore, the choice of lectotype may be narrowed to these two sheets. Number 3205 is chosen as the lectotype because of the better match with the description.

Delphinium elatum var. *occidentale* Wats., *Botany of the Clarence King Expedition* 5:11. 1871. Type: UNITED STATES. Utah, Wahsatch [sic] Mountains, July 1869, *S. Watson* 38 (LECTOTYPE [Ewan 1945, p. 137]: GH!).

Additional specimens collected by Watson and given the number 38 are found in NY! and US!. These were collected in July 1868 in the East Humboldt (Ruby) and Clover Mountains of Nevada. Watson (1871) mentions having seen the plants both "in the East Humboldt and Clover Mountains of Nevada, and in the Wahsatch" and his original description of *Delphinium elatum* var. *occidentale* could be applied to all three specimens, since he refers to members of the new taxon as "glabrous, or densely pubescent above." However, by the time he made the combination *D. occidentale*, Watson had apparently either narrowed his view of the taxon or had sent away the other specimens and no longer had them for reference. This state of affairs is suggested by the fact that when Watson made the combination *D. occidentale* (Brewer & Watson 1880b), he states "It is readily recognized by the stiff glandular spreading pubescence . . . the raceme often compound," clearly eliminating the Nevada specimens from the scope of this taxon. The presence of spreading glandular hairs and the frequently branched inflorescence are features found in plants produced as a result of hybridization between *D. glaucum* and *D. barbeyi* (Huth) Huth, indicating that Watson made his type collection in a population where hybridization was occurring between these two taxa. Such populations are quite

common in the Wasatch Mountains, but are not found in Nevada, since *D. barbeyi* does not occur in Nevada.

Delphinium exaltatum Aiton var. *barbeyi* Huth, Helios 10:35. 1893. LECTOTYPE: UNITED STATES. Colorado. Boulder County, Massif de l'Arapahoe, 10000 ft, July 1891, E. Penard 7 (G-BB!).

Huth cited two collections by Penard with his original description. The first, was that cited here as lectotype. The second was collected near the town of Caribou, Colorado. Ewan (1945) cited the Arapahoe Peak collection as the type, without having seen it or the Caribou collection (which he cited as a paratype). The Arapahoe Peak collection is the preferable lectotype since it is a more complete specimen, more closely matches the original description (tripartite bracts, subglabrous middle stem, etc.). bears a hand written label (apparently by Huth) "*Delphinium exaltatum* var. *barbeyi* n. var." and also is associated with the drawing included with the later circumscription of the taxon as a species (although this association could have been made at any time since 1893).

Delphinium glaucum Wats., in Brewer & Watson, *Geological Survey of California-Botany* 2:427. 1880. Based on citation of *D. scopulorum* A. Gray. in Brewer & Watson, *Geological Survey of California-Botany* 1:11. 1880. LECTOTYPE (here designated): UNITED STATES. California, Big Tree Road, near Camp 129, 6000 ft, 30 July 1863, W.H. Brewer 1940 (GH!); Isotypes: UC-2!, US-2!.

Watson (Brewer & Watson 1880a, p. 11) listed "Big Tree Road, Brewer" and "Sierra Valley, Lemmon" as representatives of this plant. Where he makes the combination *Delphinium glaucum* in the second volume, he cites no specimens. Since Watson worked primarily with specimens at GH, the search for a lectotype was begun there. Two specimens were located that matched the information given by Watson. These were Brewer's collection and a collection by Lemmon (716) from "Sierra Co. &c., California, 1874" Both specimens have been annotated by A. Gray as *D. scopulorum* var. *glaucum*, but only the Brewer specimen was annotated as *D. glaucum* Wats. Brewer's specimen was therefore chosen as the lectotype.

Delphinium greenei Eastwood. Bull. Torrey Bot. Club 28:674. 1901. LECTOTYPE (Ewan 1942, p. 147): UNITED STATES. California, Fresno

County, Coburn Mills, 29 May 1891, *T.S. Brandege* (CAS 801! [now 232]).

This listing is included to note the change in the accession number on the type specimen. Also, a considerable typesetting error resulted in the transposition of major parts of the paper in which *Delphinium greenei* was described, including the citation of specimens, which occurs (as far as I can discern), embedded in the discussion of another taxon, two pages before the description.

Delphinium gypsophilum Ewan, Univ. Colorado Stud., ser. D, Phys. Sci. 2:189. 1945. Type: UNITED STATES. California, Fresno County, mouth of Pinoche Creek, 550 ft, 25 April 1937, *J.A. Ewan 10295* (HOLOTYPE: COLO; Isotypes: GH!, ILL!, LA!, NO-2!, NY!, RSA!, TEX!, UC!).

A photograph of the holotype has been seen. Lewis & Epling (1954, p. 4) state that the type specimen could not be located at COLO. I have not made a search for it there. They further state that if the holotype is indeed lost, that the specimen at NO should be the lectotype. They apparently did not realize that there were two specimens at NO. Of the two specimens, the one bearing their annotation label is the sheet embossed with the Tulane University Herbarium stamp. The other sheet merely has a printed stamp from the Tulane University Herbarium on it.

Delphinium gypsophilum subsp. *parviflorum* Lewis & Epling, Brittonia 8:5. 1954. Type: UNITED STATES. California, San Luis Obispo County, 8.8 mi W US Hwy. 101 on the north road to Adelaida, *H. Lewis & C. Epling 686* (LECTOTYPE [here designated]: LA 87893!; Isotype: UC!).

Lewis & Epling (1954) did not designate a herbarium where the type sheet of their cited type collection could be found. The herbarium at LA (where they worked) would be the logical place to find the type specimen and a sheet bearing the appropriate label information and a specimen matching the description was found there. A duplicate of this collection was also found at UC. The choice of lectotype was simplified by the fact that the term "Type" had been hand written on the label of the specimen at LA and "Isotype" had been hand written on the label at UC. The writing of these terms is apparently in the same hand (probably Lewis') as that of the remainder of the label. These notes on the labels indicate that Lewis thought of the specimen at LA as "the type," making this a logical lectotype.

Delphinium hansenii arcuatum Greene, Pittonia 3:94. 1896. LECTOTYPE (Ewan 1942: 141): California, Mariposa County, Yosemite Valley, July 1896, W.L. Jepson (JEPS!).

Greene's original description states that this taxon "is a variety or subspecies which may take the name *arcuatum*." Therefore, according to the present Code of Botanical Nomenclature, Greene's name has no standing for priority, but may be used, as Ewan (1945) has, as a basionym.

Delphinium hookeri A. Nelson, Amer. J. Bot. 32:286. 1945. Based on citation of *D. exaltatum* Ait., in Hooker, *Flora Boreali Americana*. 1:25. 1840. LECTOTYPE [here designated]: CANADA. Alberta, Rocky Mountains, T. Drummond (K!).

Few specimens of *Delphinium glaucum* known to have been collected by Drummond are extant. The specimen at K fits the information given by Hooker with the description and was surely seen by him. Drummond probably collected the specimen during 1825-1827, as he was in areas where the plant is abundant and at a time of year (in each of the years) when flowering specimens could be obtained.

Delphinium inflexum Davidson, Bull. S. California Acad. Sci. 26:70. 1927. Type: UNITED STATES. California, Los Angeles County, Fish Canyon, San Gabriel Mountains, alongside *D. cardinale* and *D. parryi*, May 1927, R. Kessler 3641 (LECTOTYPE [Ewan 1945, p. 209]: LAM [now moved to RSA]; Isotypes: DS!, NO!).

The type of *Delphinium inflexum* represents plants formed by natural hybridization between *D. cardinale* and *D. parryi*. The flowering plant specimens from LAM have been moved to RSA.

Delphinium luporum Greene, Leaf. Bot. Observ. Crit. 1:76. 1904. Type: UNITED STATES. California, Tulare County, Coyote Creek, 30 July 1904, J.N. Culbertson 4392 (LECTOTYPE [here designated]: F!; Isotypes: CAS!, GH!, K!, MO!, NY!, POM!, UC!).

Greene's description includes only the citation of the type collection. There is no citation of herbarium where the type might be found. Labels of all the sheets listed above were hand written and noted to have been identified by Dr. Greene. The handwriting is apparently not Greene's, and his handwriting was not noticed on any of the sheets. As the specimen at F more clearly illustrates the features enumerated in the description, it is chosen as the lectotype.

Delphinium megacarpum A. Nelson & Macbride, Bot. Gaz. 55:373. 1913.
Type: UNITED STATES. Idaho, House Creek, 29 June 1912, A. Nelson
& J.F. Macbride 1779 (LECTOTYPE [here designated]: RM!; Isotypes:
GH!,ILL!,MIN!,MO!,NY!,RM(2)!,US!).

Nelson & Macbride (1913) specifically cite RM as the location for their types in this paper. However, three specimens of their cited collection were found at RM. The lectotype is chosen on the basis of its adherence to the characters elucidated in the description. The only significant difference between this specimen and the description is the flower color, which may have faded with time, or this population may be variable in that respect.

Delphinium menziesii var. *fulvum* Nelson & Macbride, Bot. Gaz. 61:30. 1916.
LECTOTYPE [here designated]: UNITED STATES. Idaho, Canyon
County, Emmett, 2200 m, around brush on windswept hills, 29 Apr 1911,
J.F. Macbride 794 (LECTOTYPE: RM 70930!; Isotypes: F!,MO!,NY!,
UC!,US!,WS).

Nelson & Macbride did not list any specimens with the description of their new variety. However, since they were both working at RM during the time that the paper was written, that would be a logical herbarium to search for possible authentic specimens. A single specimen (cited above) was found that carried this name. The specimen bears an annotation label reading "*D. menziesii fulvum* N. & M. n. var." The annotation label is not dated or signed. It is therefore unclear whether it was affixed by Nelson, Macbride or someone else. In any case, the specimen matches the features described for *Delphinium menziesii* var. *fulvum*.

Delphinium mohavense Parish ex Jepson, *A Flora of California* 1:526. 1914.

This combination appears to be a *nomen nudum*. It is first published in Jepson's work as *Delphinium mohavense* Parish, *ined.* as a synonym under *D. parishii*. Jepson further indicates that W.L. Jepson 5362, from Barstow, California is representative of this combination. No description has been seen for this combination. Jepson's specimen from Barstow has not been located. A T.S. Brandege collection made 27 May 1902 in the Providence Mountains and stored at UC has the penciled annotation *D. mohavense* Parish *ined.*, with the initials SBP following. In the same hand is found *Delphinium coelestinum* Rydberg. Similar notes are found on S.B. Parish 4913 in UC, without the initials. It may be that Parish realized that Rydberg's name was a later homonym and intended to propose *Delphinium mohavense* as a substitute. Tidestrom's *D. amabile* was not published as a substitute for *D. coelestinum* Rydb. until 1925

and it is not clear why Parish failed to publish his *D. mohavense* before that date.

Delphinium nudicaule Torrey & A. Gray, *Flora of North America* 1:33. 1838.

Type: UNITED STATES. California, *D. Douglas* (LECTOTYPE [Ewan 1945, p. 117]: GH!; Isotypes: BM!, K-2!, NY!).

Type material of *Delphinium nudicaule* appears to have come from coastal populations, the specimens having very similar characteristics to those of plants found on seaward facing cliffs or canyons within 5 km of the coast. The specimens are in a late flowering to early fruiting stage. Douglas most likely collected the type of *D. nudicaule* in late April or early May of 1832, in the region near San Francisco. According to McKelvey (1955), Douglas was in the region at this time, and 1832 appears to be the only year in which Douglas was in the proper area at the correct time of year to have collected the plants at the stage of growth that he did.

Delphinium nudicaule var. *elatium* Thompson, *The Garden* 19:234. 1881.

Type: UNITED STATES. California, *D. Douglas* (LECTOTYPE [here designated]: BM!; Isotypes: GH!, K-2!, NY!).

Since Thompson lists *Delphinium sarcophyllum* as a synonym with his description of the new variety and cited no other specimens or published names, the type of *D. sarcophyllum* must also serve as the type for *D. nudicaule* var. *elatium*. Thompson published the name as *D. nudicaule* var. *elatius*, but this can be treated as an orthographic error and corrected to *D. nudicaule* var. *elatium*.

Delphinium nudicaule var. *foliosum* Torrey, *Botany of the United States-Mexican Boundary Survey* 2:30. 1859. Type: UNITED STATES. California, Napa County, March 1852, *G. Thurber* 511 (LECTOTYPE [here designated]: NY!; Isotype: K!).

Since one of the distinguishing features of Torrey & Gray's original description of *Delphinium nudicaule* was the lack of cauline leaves, there is little doubt that Torrey intended to recognize this as a distinct variety. However, the validity of this combination is questionable. Torrey's original description has merely the notation "*Delphinium nudicaule*, Torr. & Gray, Fl. 1, p. 33 & 661. Var. *caule folioso*. Napa county, California; March; *Thurber*." After a search of many herbaria, the only specimens found that fit the data given by Torrey are the two cited above. Both of these specimens bear the name *D. nudicaule* var. *foliosum*.

Delphinium nutans A. Nelson, Amer. J. Bot. 32:287. 1945. Type: UNITED STATES. Alaska, Kantishna Mining District, just outside Mount McKinley National Park, steep hillside meadow, 21 July 1939, A. & R. Nelson 3910 (LECTOTYPE [here designated]: RM 184988!; Isotypes: GH!, ILL!, RM 184987!, UC!, US!).

Nelson did not clearly designate a holotype with his description, although he wrote that the type was at RM. The isotypes at herbaria other than RM are clearly marked as such, either by typescript with the original typing of the labels, or by hand notation in the same hand as found on specimens in RM (indicating that the notes were probably made before distribution of the specimens from RM). The two specimens at RM both bear the typewritten inscription "TYPE" on them, but one of them has "Isotype" written on it in the same hand as that just mentioned. The notes have been assumed to have been made by Nelson, thus making the specimen indicated a logical lectotype. The specimens from the type collection are apparent hybrids between *Delphinium glaucum* and *D. brachycentrum* Ledeb. Both taxa are found in the area of the type collection of *D. nutans*, and putative hybrid individuals have been observed by the present author

Delphinium parishii var. *inopinum* Jepson, *A Flora of California* 1:526. 1914. Type: UNITED STATES. California, Tulare County, Kern River Canyon, near Junction Meadows, 7800 ft, 13 July 1912, W.L. Jepson 5012 (LECTOTYPE [here designated]: JEPS 2555!; Isotype: JEPS 2556!).

Jepson cited the collection number and brief locality, but not a herbarium with his description of *Delphinium parishii* var. *inopinum*. His own herbarium was a logical place to look for the type, and two sheets were found. No other sheets of this collection have been found in other herbaria. The lectotype is chosen because it shows the features of the taxon somewhat more clearly than the other specimen and also because the word "type" has been hand written on the packet glued to the sheet. It appears to be in the same hand as that found on the labels (probably Jepson's, but in any case the notation was made very early in the preparation of the specimens).

Delphinium parryi A. Gray, Bot. Gaz. 12:53. 1887. LECTOTYPE (here designated): UNITED STATES. California, San Bernardino County, 1876, C.C. Parry & J.G. Lemmon 5 (GH!); Isotypes: F!, NY-2!.

Gray's (1887) citation of specimens reads "founded on specimens collected in San Bernardino County, California, by Parry in 1850. Parry and Lemmon in 1876, and by Parish; also apparently the same collected near Santa Barbara

by Brewer." These are syntypes as Gray has listed them. Ewan (1945, p. 180) cites the Parry collection of 1850 at NY as the type and lists *Parry & Lemmon 5* as a paratype. Ewan's choice of lectotype for *Delphinium parryi* must be contested. The specimen cited by Ewan, said to be in NY, could not be located and any notes that may have been made on it are not known to me. I have seen no collection from San Bernardino Co. by Parry in 1850 from any herbarium consulted (see list in Acknowledgments). Specimens of *Parry & Lemmon 5* are found in F, GH and NY(2). Of these, only the sheet in GH has been annotated by Gray as *D. parryi*. Specimens collected by Parish that fit the data are: San Ignacio Pass, 12 March 1881, *Parish & Parish 256* (GH!); Mentone, 5 May 1885, *Parish 2027* (JEPS!-other specimens with this number bear different collection data); San Gorgonio Pass, April 1882, *Parish 256* (MASS!); foothills, San Bernardino Mts., May 1885, *Parish 256* (MO!); San Gorgonio Pass, March 1881, *Parish & Parish 256* (G-BB!); Cabezon, April 1882, *Parish & Parish 256* (G-BB!, P!); border of Colorado Desert, Cabezon Station, SPRR, March 1883, *Parish & Parish 255* (UC!). The only one of these that Gray was certain to have seen and which bears his annotation as *D. parryi* is the *Parish & Parish 256* specimen at GH (which is on the same sheet as *Parry & Lemmon 5*, but bears a separate annotation by Gray). The only Brewer collection I have located which might be that referred to by Gray is *Brewer 331*, 25 May 1861 (K!, UC!). Brewer's specimens can be eliminated as possible lectotypes on the basis of Gray's less than certain inclusion of them under *D. parryi*. In fact, the collection would be later cited as a paratype of *D. parryi* subsp. *maritimum* (Davidson 1908). Among these possibilities, the only specimens that Gray is certain to have seen are the collections by Parish & Parish and by Parry & Lemmon at GH and the logical choice of lectotype should come from one of these two. The Parry & Lemmon specimen is chosen because it is a more complete specimen, showing the root (not found on the Parish & Parish specimen), although this plant is somewhat shorter and with fewer lobes on the leaves than most *D. parryi* from that region.

Delphinium ornatum Greene, *Flora Franciscana* 304. 1892. Type: UNITED STATES, California, San Luis Obispo County, Nipoma Mesa, 10 April 1861, *W.H. Brewer 409* (LECTOTYPE [here designated]: UC 9252!; Isotypes: GH!, UC!, US!). Not *Delphinium ornatum* Bouche, Bot. Zeit. 1:25. 1843.

Greene cites "State Survey n. 409" as representative of his new name. W.H. Brewer did most of the botanical collecting for the State Geological Survey. At the time he published *Delphinium ornatum*, Greene was at the University of California, where most of the specimens from the survey are housed. Two specimens that fit the data for possible types were located at UC. The lectotype

was chosen on the basis of Greene's reference in his description to the State Survey collection without mentioning Brewer. It is almost certain that Brewer was the collector of both specimens at UC.

Delphinium parryi subsp. *eastwoodae* Ewan, Univ. Colorado Stud., ser. D, Phys. Sci. 2:182. 1945. Type: UNITED STATES. California, San Luis Obispo County, McDonalds Ranch, 2 May 1896, A. Eastwood (HOLOTYPE: CAS 991 [now 236!]).

Included to note the change in accession number of the type. In additions, see discussion under *Delphinium parryi* subsp. *ramosum*.

Delphinium parryi subsp. *ramosum* (Eastwood) Ewan, Univ. Colorado Stud., ser. D, Phys. Sci. 2:87. 1945. LECTOTYPE (here designated): UNITED STATES. California, San Luis Obispo County, McDonalds Ranch, 2 May 1896, A. Eastwood (CAS 991!).

This combination has not been validly published, although it has been effectively published. The combination appears in Ewan's key to the California taxa of *Delphinium* as *D. parryi eastwoodae*, but no reference is made to it in the text of his work. The type specimen for *D. parryi* subsp. *eastwoodae* bears the inscription "*D. variegatum* var. *ramosum* n. var." on its original label. Ewan annotated the specimen in 1943 with the combination *D. parryi* subsp. *ramosum* (Eastwood) Ewan, apparently thinking that Eastwood had published her new variety and Ewan intended to use it as a basionym for his subspecies. By the time he published his synopsis, Ewan apparently realized that Eastwood had not published var. *ramosum* and it was therefore unavailable for use as a basionym. He then apparently chose to use the name *eastwoodae* for his subspecies in the text of his work, but forgot to make the appropriate change in the key. This interpretation is supported by the fact that *D. parryi* subsp. *eastwoodae* does not occur in the key and seems to fit in the location where *D. parryi ramosum* is found.

Delphinium parishii subsp. *purpureum* Lewis & Epling, Brittonia 8:15. 1954. Type: UNITED STATES. California, Ventura County, Cuddy Valley Road, 0.1 mi from jct. with Cuddy Canyon Road, Mount Pinos, 5 June 1943. H. Lewis & D. Dunn 478 (LECTOTYPE [here designated]: LA 87897!; Isotypes: CAS!, GH!, RSA!, UC!).

Specimens in each of the herbaria cited above, with the exception of the one at LA, all bear the handwritten term "Isotype" on them. It appears to be

in the same hand (probably Lewis') as that which wrote the collection number and combination on the labels. The specimen at LA bears no notation of this kind, although the word "Type" is written on it above the label (it appears to be a different hand). Further complicating what would seem a straightforward choice for the lectotype is the fact that the type collection was made in an extremely variable population. The specimen at LA is somewhat unlike other members of the taxon in that it is a very robust individual, taller than normal, with an abundance of branches, leaves much larger than normal and leaves more common on the stem than most plants of this subspecies. The specimens in other herbaria are much more representative of the average plants in most populations. While it is tempting to choose a lectotype that better illustrates the features of the taxon, there is little doubt that the specimen at LA was meant by the authors as the type for their new name. Therefore, that specimen is designated as the lectotype.

Delphinium patens Benth., *Plantae Hartwegianae* 296. 1848. Type: UNITED STATES. California, in valle Sacramento, 1847, K.T. Hartweg 1632 (224) (HOLOTYPE: K!; Isotypes: BM!, G!, K!, NY!, P!).

The type collection may have come from Marysville Buttes, Sutter County, which Hartweg visited in early May of 1847 (McKelvey 1955) and should have been able to collect the plant at the proper stage of growth.

Delphinium peltatum Hooker ex Huth, Bot. Jahrb. Syst. 20:449. 1895. *nomen nudum*.

This combination was found on a sheet of Douglas' collection of *Delphinium nudicaule* from California, in the Hooker Herbarium at K. It appears that Hooker's original name for what he published as *D. sarcophyllum*, would have been *D. peltatum*. Drawings had been prepared, but I have seen no manuscript by Hooker mentioning this combination. Huth (1895, p. 449) cites *D. peltatum* in synonymy under *D. nudicaule*, stating that the name had been found on a specimen at LE.

Delphinium penardii Huth, Helios 10:34. 1893. LECTOTYPE [here designated]: UNITED STATES. Colorado, Boulder County, Flagstaff Hill, near Boulder, 6000 ft, July 1891, E. Penard 8 (G-BB!).

Huth (1893) cites "Floret Julio. . . . Colorado. Flagstaff Hill and Boulder 2000 m alt. (E. Penard 1891 HEB.)" with his description of *Delphinium penardii*. A search for possible type specimens for this name at G-BB (HEB was

Huth's abbreviation for Boissier's Herbarium) yielded three prospective type specimens. These were the lectotype cited above and two sheets from Colorado, Boulder, 5000 ft, July 1891, *E. Penard* 9. The specimen chosen as the lectotype, best shows the characters of the taxon as described by Huth. The flowers in the packet may well have been used to draw the diagram published with the description. The lectotype chosen here bears a label in the same hand as that noted on the lectotype of *D. barbeyi*, reading "*D. penardii* Hth."

Delphinium polycladon Eastwood, Bull. Torrey Bot. Club 28:669. 1901. Type: UNITED STATES. California, Fresno County, South Fork of Kings River, near the forks of Bubbs Creek, in a thicket in springy ground, 9 July 1899, *A. Eastwood* (LECTOTYPE [Ewan 1945: 141]: CAS 931 [now 229]!; Isotype: CAS 230!).

Ewan's rationale for his choice of the lectotype is not clear. I found no indication in the description or on the labels to indicate which specimen might have been taken by Eastwood as the primary type. In my opinion, the specimen that is now the isotype, better illustrates the features of the species as it is found in nature than does the lectotype. However, this is an insufficient reason to change the choice of lectotype.

Delphinium pratense Eastwood, Bull. Torrey Bot. Club 28:669. 1901. Type: California, Fresno County, Horse Corral Meadow, S Fork Kings River, 9 July 1899, *A. Eastwood* (CAS 990! [now 238]).

The CAS specimen appears to be the only representative of this collection, others not having been found in the herbaria listed in the acknowledgments. In any case, even though Eastwood merely cited the type collection by locality and date, but did not indicate a herbarium for the specimen along with her description (as she did for other plants in the same publication), there is little doubt that this is the proper type specimen. The specimen has "Type" written on its label, in apparently the same hand (assumed to be Eastwood's) as that with which the precise locality information was recorded on the label. If the specimen cannot be considered a holotype, then lectotypification was effected by Ewan (1945, p. 104).

Delphinium quercetorum Greene, *Plantae Bakerianae* 3(1):4. 1901. Type: UNITED STATES. Colorado, Montrose County, Gunnison Watershed, Cerro [Summit, 8000 ft], 12 July 1901, *C.F. Baker* 412 (LECTOTYPE [Ewan 1945, p. 139]: ND-G 3485!; Isotypes: GH!K!LA!MIN!MO!NY!, POM!RM-2!UC!US!Z-2!). Not *D. quercetorum* Boiss. & Hausskn., *Flora Orientalis*, Suppl. 20. 1888.

Delphinium bakerianum Bornmüller (Bull. Herb. Boissier II 4:1084. 1904.) has been provided as a substitute name for *D. quercetorum* Greene.

Delphinium robustum Rydberg, Bull. Torrey Bot. Club 28:276. 1901. Type: UNITED STATES. Colorado, Las Animas County, Wahatoya Creek, below the Spanish Peaks, 7 July 1900, *P.A. Rydberg & F.K. Vreeland 6217* (LECTOTYPE [here designated]: NY!; Isotypes: NY!, RM!).

Rydberg did not cite a repository for his type of *Delphinium robustum*. Ewan (1945) cited the type as being present at NY. A search of *Delphinium* specimens at NY yielded two sheets of the type collection. The one with the description glued on to the sheet is designated as lectotype. There is no apparent notation by Rydberg that one or the other specimen is to be preferred as a type.

Delphinium roseum Heller, Muhlenbergia 2:35. 1905. Type: UNITED STATES. California, Kern County, rocky ridge to the north of the mouth of Kern Canyon, 12 April 1905, *A.A. Heller 7655* (LECTOTYPE [here designated]: CAS 228!; Isotypes: AC!, BM!, CAS 227!, F!, GH!, K!, MO!, NY!, P!, PH!, POM!, UC!, US!).

Ewan (1945, p. 97) had previously provided a lectotype (PH). However, this lectotypification must be superseded, because in the introductory material of the paper where Heller described *Delphinium roseum*, he states "The types of all new species described by me from this collection are deposited in the herbarium of the Academy." This refers to the California Academy of Sciences (CAS), and the type must be located there. Two specimens of *Heller 7655* are housed at CAS. One has been chosen here as the lectotype.

Delphinium ruthae Nelson, Amer. J. Bot. 32:287. 1945. Type: UNITED STATES. Alaska, Mount McKinley National Park, above Sable Pass, near mile post 44, 8 August 1939, *R.A. Nelson 4052* (LECTOTYPE [here designated]: RM!; Isotypes: GH-2!, ILL!, MO!, NY!, UC!, US!).

Nelson did not specify a herbarium where the type of *Delphinium ruthae* might be found. He had designated a herbarium (RM) for *D. nutans* which he described just preceding *D. ruthae* in the same paper. There is little doubt that Nelson meant the specimen at RM as the type, and it matches the published description well.

Delphinium sarcophyllum Hooker & Arnott. *The Botany of Captain Beechey's Voyage* 317. 1838. Type: UNITED STATES. California, *D. Douglas* (LECTOTYPE [here designated]: BM!; Isotypes: GH!, K-2!, NY!).

Hooker & Arnott's combination may be interpreted as a superfluous name, since they cite *Delphinium nudicaule* Torrey & Gray as a synonym and the same collection is used to provide type specimens for both names. On the other hand, Hooker & Arnott specifically state that their plant is different from that of Torrey & Gray, and enumerate the differences in their descriptions both in Latin and English). In addition, it is by no means certain that Douglas made only a single collection of *D. nudicaule* (or any other species that he collected more than one sheet of), since the label information on most Douglas specimens read simply, California, Douglas, 1833 or Nova California, Douglas, 1833. Of course, Douglas did little if any collecting in California in 1833. Thus, labels are of little help in determining where and when Douglas made his collections in California.

Delphinium scopulorum A. Gray, *Plantae Wrightianae* 2:9. 1852. Type: UNITED STATES. New Mexico, Grant County, 10-15 mi E Santa Rita del Cobre, near the Mimbres River, mountain ravine, 27 October 1851, *C. Wright* 842 (LECTOTYPE [Ewan 1942, p. 147]: GH!; Isotypes: K!, MO!, US!).

Additional details on Wright's collecting localities and itineraries was found in Johnston (1940). Details of the date and a more precise locality were found there than on the herbarium labels. The name *Delphinium scopulorum* has been greatly misused by collectors ever since its description by Gray. For a time, during the latter part of the 19th century, almost any large *Delphinium* from western North America was called *D. scopulorum*. The practice continued well into the 20th century, and still occurs now. The difficulty with this name apparently stems from a quirk of circumstances involving middle 19th century botanical exploration and economics. A significant part of Charles Wright's income during his travels in western North America was derived from sale of his specimens. Gray acted as an agent of sorts for Wright, arranging the sale of sets of specimens to various individuals and institutions. Collectors would collect a large number of specimens of any given species, so that each subscriber could get a complete set of the plants. At times, it was not possible to obtain large numbers of a given plant, and sets were sometimes made up of multiple collections from different localities. Normally, collectors and/or their agents would make sure that a collection was made up of similar individuals. Such, apparently were the circumstances when Gray received the packet of Wright's plants containing the type collection of *D. scopulorum*. There were not enough duplicates of Wright's collection of *D. scopulorum* to fill all the orders and other

Delphinium specimens (presumably collected by Wright) were included under the same number for distribution. Gray apparently did this routinely with Wright's collections, as Ewan (1942) quotes E.T. Wherry "Wright numbers are meaningless, one number on sheets in 4 different herbaria bearing 4 separate species or subspecies." In the case of *D. scopulorum*, this action set in motion a chain of events that has led to the present confusion concerning this species.

Delphinium scopulorum is a very well marked and geographically relatively confined species of southeastern Arizona and southwestern New Mexico. The specimens cited above represent the normal appearance of the plants, which have dimorphic leaves, usually have basal leaves at anthesis and are found primarily in riparian woodlands of the lower slopes of the mountains in these areas. On the other hand, a supposed duplicate of this collection (it bears the number 842) at PH is quite a different plant. It is a relative of *D. novomexicanum* Wooton (which was not described until 1910) and a plant that has monomorphic leaves, no basal leaves at anthesis and in the region where *D. scopulorum* grows, is found in subalpine meadows. The origin of the specimen is not clear, as Wright's itinerary does not indicate that he was high in the mountains often. It is possible that Wright collected this plant during an excursion to the mountains of southeastern Arizona. In any case, although Gray's description clearly is derived from the plants represented by the lectotype, his own interpretation of *D. scopulorum* in later years suggests that he actually thought that only a single species was represented under Wright's number 842. Exacerbating the problem, Ewan (1942) published a photograph of the *Wright 842* specimen at PH and stating that it represented the species better than the type in GH.

The upcoming *Flora of North America* may help to solve the problem of misidentification and misunderstanding of *D. scopulorum*. In the meantime, it is always interesting to examine the *D. scopulorum* folder in a herbarium from which I have not previously studied the specimens.

Delphinium scopulorum var. *stachydeum* A. Gray, Bot. Gaz. 12:52. 1887.

LECTOTYPE [here designated]: UNITED STATES. Oregon, Union County, July 1886, *W.C. Cusick 487* (GH!).

Three specimens collected by Cusick and fitting the data provided by Gray were found at GH. The pertinent information on these sheets is summarized as follows: 1) 1886, *Cusick 487*, annotated in Gray's hand with his new combination (the sheet contains all the above ground parts of one individual and the inflorescence of another); 2) 1886, *Cusick 487*, also annotated by Gray with his new combination (the sheet contains most of the above ground parts of one individual and part of a fruiting inflorescence of another); 3) Union County, Oregon, 1886, *Cusick 487*, also annotated by Gray (the sheet contains

four sections of stem, from as many as four different individuals, two with single leaves attached, one being the terminal inflorescence branch and the fourth bearing a short branch from an inflorescence). Other Cusick specimens matching the data and found elsewhere are (all from Oregon): 4000 ft., dry soil, July 1886, *Cusick 487* (F); base of Blue Mountains, 4000 ft., dry rich soils, 1886 *Cusick 487* (UC); base of Blue Mountains, head of Power River to head of Burnt River, July 1886, *Cusick 487* (UC); base of Blue Mountains, rich dry bottoms, *Cusick 487* (PH); Union County, August 1877, *Cusick 487* (G-BB [2]). Gray also cited Pringle collections from Arizona and New Mexico as representative of his new var. *stachydeum*. The source of this reference is unclear. The apparent source of this citation is *Pringle 304* from Arizona (GH). This specimen is somewhat intermediate between *Delphinium scopulorum* A. Gray and *D. andesicola* Ewan and may represent a hybrid between those two taxa. In any case, Gray's description was apparently based on the Cusick collection and not that of Pringle. Therefore, one of the Cusick specimens cited above must be designated as the lectotype. The others may be isotypes, but due to the variation in data among the various specimens, I will not formally include them as isotypes even though each is *D. stachydeum*. Since it is clear by his annotations that Gray had seen the specimens at GH, and similar annotations are not found on the specimens at other institutions, the lectotype must come from among those at GH. The basis of choice of lectotype was the match with the description and the fact that specimen on the right hand side of the sheet is almost a complete plant. Tidestrom's combination is apparently the correct one for this name, even though he did not provide a complete citation of the basionym at the time he published it and he merely used the name in the discussion of another species (although he did cite *D. scopulorum* var. *stachydeum* Gray). The same combination was published again (with Nelson & Macbride as the non parenthetical authors), two years later (Bot. Gaz. 61:31. 1916) with full citation of Gray's description. Though Tidestrom's combination would not be valid under today's Code of Botanical Nomenclature, it was valid at the time it was published and therefore Tidestrom's name is the proper authority to associate with *D. stachydeum*.

Delphinium sonnei Greene, Pittonia 3:246 (1897). LECTOTYPE [here designated]: UNITED STATES. Nevada, Trinity Mountains, May 1868, S. Watson 39 (GH!); Isotype: (US!).

Ewan (1945, p. 116) had previously provided a lectotype as: UNITED STATES. California, Nevada County, Donner Lake, 21 July 1893, E.L. Greene (ND-G 3389!). However, since Greene's *Delphinium sonnei* is based on *D. decorum* var. *nevadense* Wats., Ewan's lectotypification of *D. sonnei* is superfluous. Watson (Brewer & Watson 1880a) clearly indicated that *Delphinium decorum*

var. *nevadense* was based on *D. menziesii* (sensu Watson) of the *Botany of the Clarence King Expedition*. Watson (1871), in his discussion of what he recognized as *D. menziesii*, cites his number 39 as typical of the plant, with his number 40 having pink flowers and number 41 with double flowers. The choice of lectotype is based on the best match with Watson's original concept of *D. menziesii* (1871, p. 11), both by his statements in the protologue and the description of the plant.

Delphinium trolliifolium A. Gray, Proc. Amer. Acad. Arts 8:375. 1872. Type: UNITED STATES. Oregon, [Benton County, Silver Creek,] 1871, *E. Hall* 15 (LECTOTYPE [Ewan 1945, p. 142]: GH!; Isotypes: BM!, F!, K!, MO-2!, P!).

Most specimens of the type collection have merely Oregon, 1871, *E. Hall* 15 on them. However, the specimen at F has the additional information "Silver Creek" which is in Benton County, near Corvallis and where the species is locally abundant. The type had previously been thought to have come from the lower Columbia River.

Delphinium uliginosum Curran, Proc. California Acad. Sci. 1:151. 1885. Type: UNITED STATES. California, Colusa County, near Epperson's, swampy ground, July 1884, *M.K. Curran* (LECTOTYPE [Ewan 1945, p. 98]: CAS!).

There is little doubt that the specimen cited by Ewan is that which was meant as the type by Curran. No other specimens of *Delphinium uliginosum* collected by Curran have been found in numerous searches of herbaria. Curran cited Lake County with the collection data in the description, but the specimen label reads Colusa County. The plant represented by this type is very distinct and ecologically restricted to serpentine seeps.

Delphinium umbraculorum Lewis & Epling, Brittonia 8:19. 1954. Type: UNITED STATES. California, Santa Barbara County, San Rafael Mts., 1.4 mi N Davy Brown Campground, 14 May 1949, *H. Lewis*, *M. Lewis* & *M. Mathias* 792 (LECTOTYPE [here designated]: LA!; Isotypes: RSA!, UC!).

The specimen selected as the lectotype is undoubtedly the sheet considered by Lewis & Epling as their primary type. This position is suggested by the fact that the label of the sheet at LA has the word "Type" written on it in the same hand (probably Lewis') as that which completed the rest of the label.

Further, the sheets at RSA and UC each have "isotype" printed or written on their labels, apparently before they were distributed to those herbaria.

Delphinium variegatum Torrey & A. Gray, *Flora of North America* 1:32. 1838.

Type: UNITED STATES. California, *D. Douglas* (LECTOTYPE [Ewan 1945, p. 184]: GH!; Isotypes: K-2!, LE, NY!).

Additional specimens *Delphinium variegatum* at K, collected by Douglas, appear to have come from an area other than that where Douglas collected the lectotype. As with several of Douglas' type collections for *Delphinium*, it appears that he collected the same species at different times and places. It is likely that Douglas made the type collection in late April of 1831, in central Monterey County, during a trip to Santa Barbara.

ACKNOWLEDGMENTS

I wish to express my sincere appreciation to the directors, curators and staff of the following herbaria who have either loaned specimens for my study or allowed me to consult their collections during my visits. Herbaria are listed by their acronyms as they appear in Index Herbariorum. AC, ARIZ, ASTC, ASU, B, BM, C, CAS, CM, CS, DAV, DS, DWC, ECON, ENCB, F, G, GFND, GH, ILL, ISM, JEPS, K, LA, LINN, LL, MASS, MEXU, MINN, MO, MWI, ND, ND-G, NMC, NO, NY, OSC, P, PAC, PH, POM, RM, RSA, SBBG, TAES, TAMU, TENN, TEX, TRT, UBC, UC, US, UTC, VDB, WILLU, WIS and Z. This study was made possible in part, by grants from Research Enhancement Funds from Sam Houston State University and from the Friends of the Jepson Herbarium.

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BOOK REVIEWS

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Vascular Plants of Northern Utah an Identification Manual. Richard J. Shaw. Utah State University Press, Utah State University, Logan, Utah 84322-7800, USA. 1989, 412 pp., \$27.95, paper. ISBN 0-87421-141-7.

This book is intended as a guide for taxonomy students working with the flora of northern Utah. As such, it contains certain items not often found in most floristic manuals. These include a section in the introduction on the use of keys, philosophy of writing keys, inclusion of introduced taxa not necessarily naturalized and several caveats for the beginning worker. Far from detracting from the work, these "extras" enhance the value of Shaw's contribution. The keys are straightforward, easy to use and as far as I have used them, generally accurate. Only two errors were noted, neither likely to cause great difficulty (*Delphinium ajacis* has two petals, not 4-making it somewhat difficult to key this species to the proper genus; tepals in *Anemone* are not necessarily in a single whorl). The series of keys begins with keys to divisions and classes. Within each division and class, is a key to families. Each family is briefly described, the description followed by a generic key. The alphabetical listing of families within divisions and classes, and genera within families is useful for more experienced workers who can go directly to the family or generic keys without consulting the index for the proper pages. A brief description of the habitat and range of each species is given following the species keys. Morphological features of the species are not enumerated outside the species keys. Common names for taxa are listed throughout the work. Representatives of many families are illustrated by line drawings, further enhancing the usefulness of the keys. A glossary is included to define technical terms used in the keys and illustrations of many common descriptive morphological terms follow the glossary. The geographic region covered by the work is shown by a map inside the front cover and a handy ruler is found inside the back cover. This work is quite usable and I recommend it for anyone working with the northern Utah flora.

North American Trees Exclusive of Mexico and Tropical Florida, 4th edition. Richard J. Preston, Jr. Iowa State University Press, 2121 S. State Avenue, Ames, Iowa 50010, USA. 1989, xxvii, 407 pp., \$39.95 (hardcover) ISBN 0-8138-1171-6; \$19.95 (paper) ISBN 0-8138-1172-4.

A tremendous wealth of information is contained within this volume. Many species have extensive descriptions morphological features, economic importance and habitat. Most of the descriptions are accompanied by drawings and range maps on the facing page. The vast majority of the drawings are quite good and most of the range maps are good, but several of the maps are of such a quality as to make gleaning information from them difficult (i.e. pp. 140,186,192). A standard format for the base maps would probably help (i.e. either include the county outlines or not, rivers or not, state boundaries dashed or solid, but be consistent throughout the book). In addition, the book suffers from some inconsistencies and errors in information. The inconsistencies come in the treatments of various taxa. Namely, species key are not included for the *Pseudotsuga*, *Taxodium*, *Thuja*, *Torreya* and *Taxus*, to name a few. All these genera are represented in the book by more than one species and a key to them should be included. For other genera, species are found in the key but accompanied by no further description. It is probably preferable to key them out and not discuss them further, than to discuss them but not provide a key. The greatest difficulty that I had with the work was that the author consistently refers to "flowers" and "fruits" of Gymnosperms. These plants have neither. Of lesser importance were the choices made as to which taxa to include in this work. Such plants as *Sophora secundiflora*, *Symplocos tinctoria*, *Koerberlinia spinosa*, *Ungnadia speciosa* and *Cephalanthus occidentalis* are treated in this book. While some of these plants may grow to as much as 5 m in height, most of them are not in tree form. At the same time, *Avicennia germinans*, *Garrya wrightii*, *Porlieria angustifolia*, *Sabal texana* and *Ziziphus obtusifolia* (all from Texas and each more often in tree form than the previously mentioned five species which also occur in Texas), are not included. Overall, the book contains an abundance of information and can be quite useful, assuming a reader realizes the limitations of the work. Unfortunately, the individuals at whom the book appears to be aimed (persons other than plant taxonomists) probably will not realize its limitations.

American Horticultural Society Encyclopedia of Garden Plants.
Christopher Brickell, ed. MacMillan Publishing Co., 866 Third Ave., New York, NY, 10022, USA. 1989, 608 pp., \$49.95 (cloth). ISBN 0-02-557920-7.

A large portion of this book is just what it says it is, and encyclopedia to garden plants. This part occupies the last third of the volume, and consists

of an alphabetical listing to over 8000 garden plants. Within these listings, means for propagation, conditions under which the plant will grow, brief descriptions and uses for the plants are found. For about half of the plants listed in this part of the work, there are also references to pages in the earlier part of the volume where photographs of the plants may be found. The real joy of this book is the part with the pictures, the plant catalogue. In this catalogue are thousands of excellent photographs of many garden plants. While the order of treatment of the plants follows no phylogenetic or even alphabetical pattern (the catalogue is arranged by habit, size, season of importance and color of the plants) the system is adequately explained in the introductory material and you can always fall back to the encyclopedic listing to locate the proper pages containing pictures of the plant of interest. Accompanying each photograph is a listing of the Latin name for the plant, its common name(s), a short description of prominent features, sunlight requirements, water requirements, geographic zones (illustrated inside front and back covers) where the plant will grow in North America and a silhouette drawing representing the shape of the mature plant. Introductory material contains information on how to use the book, a brief summary of how plants are named and introduced into cultivation, indices to plants for specific uses or areas (i.e., plants for quick cover, plants for hedges, plants for moist shade, plants for sandy soil, etc.), and information with illustrations on how to design an ornamental garden. The end of the book contains a brief glossary and a common names index. A wealth of information is found in this volume and although it will not be generally useful to systematists, it is worth the purchase price for the pictures alone.

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CORRECTIONS IN VOLUME 67

- p. 326 For *Puya waist*, read *Puya westii*.
p. 417, line 2 of abstract, for Polygonaceae, read Polygonaceae.

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